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INSTRUCTION MANUAL

REGULATED POWER SUPPLIES

LCS-A SERIES
This manual applies to units
bearing serial no. prefixes A-D

LAMBDA

LAMBDA ELECTRONICS CORP.–MELVILLE, L. I., N. Y.

THIS SPECIFI[illegible]N IS APPROVED
FOR USE IN T[illegible]BRATION OF
COMPANY INSTRUMENTS.
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QC FACILITIES
CALIBRATION DEPARTMENT
Date: 25-1-81
BRITISH AIRCRAFT CORPORATION STEVENAGE.

INSTRUCTION MANUAL

FOR

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This manual provides instructions intended for the operation of Lambda power supplies, and is not to be reproduced without the written consent of Lambda Electronics Corp. All information contained herein applies to all LCS-A models unless otherwise specified.

LAMBDA ELECTRONICS CORP. MELVILLE, L.I., N.Y.
MAIN PLANT TELEPHONE: 516 MYrtle 4-4200

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SPECIFICATIONS AND FEATURES

Specifications apply for all models.

DC OUTPUT--Voltage regulated for line and load.

TABLE I

VOLTAGE AND CURRENT

RANGES

MODEL	VOLTAGE RANGE	MAXIMUM CURRENT (AMPS) AT AMBIENT TEMPERATURE			
		40°C	50°C	60°C	71°C
LCS-A-2	2±5%	3.0	2.5	2.0	1.4
LCS-A-3	3±5%	3.0	2.5	2.0	1.4
LCS-A-3P6	3.6±5%	2.9	2.4	1.9	1.3
LCS-A-4	4±5%	2.9	2.4	1.9	1.3
LCS-A-4P5	4.5±5%	2.8	2.3	1.8	1.2
LCS-A-5	5±5%	2.7	2.3	1.8	1.2
LCS-A-6	6±5%	2.6	2.2	1.8	1.2
LCS-A-8	8±5%	2.4	2.0	1.7	1.1
LCS-A-10	10±5%	2.1	1.8	1.5	1.0
LCS-A-12	12±5%	1.9	1.7	1.3	0.9
LCS-A-15	15±5%	1.8	1.5	1.2	0.9
LCS-A-18	18±5%	1.6	1.3	1.1	0.8
LCS-A-20	20±5%	1.4	1.2	1.0	0.8
LCS-A-24	24±5%	1.1	1.0	0.85	0.70
LCS-A-28	28±5%	1.0	0.9	0.75	0.60
LCS-A-36	36±5%	0.90	0.80	0.70	0.50
LCS-A-48	48±5%	0.60	0.55	0.50	0.45
LCS-A-100	100±5%	0.18	0.18	0.18	0.18
LCS-A-120	120±5%	0.15	0.15	0.15	0.15
LCS-A-150	150±5%	0.10	0.10	0.10	0.10

TABLE I (Cont'd)

MODEL	VOLTAGE RANGE	MAXIMUM CURRENT (AMPS) AT AMBIENT TEMPERATURE			
		40°C	50°C	60°C	71°C
LCS-A-01	0-7	2.0	1.9	1.6	1.1
LCS-A-02	0-18	1.1	1.0	0.9	0.7
LCS-A-03	0-32	0.69	0.64	0.60	0.45
LCS-A-04	0-60	0.37	0.34	0.31	0.25
LCS-A-05	0-120	0.10	0.10	0.10	0.10

Current range must be chosen to suit the appropriate maximum ambient temperature. Current ratings apply for entire voltage range.

REGULATED VOLTAGE OUTPUT

Regulation (line) . . . . . 0.01 percent plus 1.0 millivolt for input variations from 105-132 or 132-105 volts AC

Regulation (load) . . . . . 0.01 percent plus 1.0 millivolt for load variations from no load to full load or full load to no load

Remote Programming

External Resistor . . . . . Nominal 1000 ohms/ volt output

Programming Voltage . . . . . One-to-one voltage change

Ripple and Noise . . . . . 250 microvolts rms; 1 millivolt peak to peak with 57-63 Hz input

Temperature Coefficient . . . . . Output change in voltage (0.01% + 0.3%mv)/°C using an external programming resistor, less than (0.015% + 0.3%mv)/°C with internal resistor

Remote Sensing . . . . . Provision is made for remote sensing to eliminate effect of power output lead resistance on DC regulation

AC INPUT--105-132, 205-265 or 187-242 ("V" option) volts AC at 47-440 Hz. Maximum input power*: 80 Watts. Ratings apply for 57-63 Hz.; at 47-57 Hz input derate current 10% for each ambient temperature given in table I. For 63-440 Hz, consult factory for details of operation.

* With output loaded to full 40°C rating and input voltage 132 volts AC, 60 Hz.

OVERLOAD PROTECTION

Thermal	Thermostat, resets automatically when over temperature condition is eliminated
Electrical	
External	Automatic electronic current limiting circuit, limits output current to a preset value less than 140% of 40°C current rating. Automatic current limiting protects the load and power supply when external overloads and direct shorts occur
Internal	Fuse F1 provides protection against internal circuit failure in conjunction with over-voltage protector option

INPUT AND OUTPUT CONNECTIONS--Terminal block on rear of chassis.

OPERATING AMBIENT TEMPERATURE RANGE AND DUTY CYCLE--Continuous duty from -20°C to 71°C ambient with corresponding load current ratings for all modes of operation

STORAGE TEMPERATURE - (non-operating) -55°C to 85°C

CONTROLS

DC output control	Voltage adjust control permits adjustment of DC output voltage via access hole located in nameplate

PHYSICAL DATA

Size	3-3/16" x 3-5/16" x 6-1/2"
Weight	6 lbs. net; 7 lbs. shipping wt.
Finish	Grey, FED STD 595 No. 26081

MOUNTING - Three surfaces, each with tapped mounting holes, can be utilized for mounting this unit. All LCS-A power supplies can be mounted with the Top, Front, or Right Side facing up. Top, Front, or Right Side must be in a horizontal plane. Refer to figure 12 for mounting details.

MODEL OPTIONS

Suffix "V" Input Option.	Standard LCS-A power supplies can be obtained for 205-265 VAC, 47-440 Hz input or 187-242 VAC, 47-440 Hz input. See nameplate for AC input rating. See schematic diagram for rewiring of AC input. At 47-57 Hz input, derate current 10% for each ambient temperature given in Table I. For 63-440 Hz consult factory for details of operation.

Suffix "S" Option . . . . . (LCS-A-3 through LCS-A-48 Only)	Fixed voltage LCS-A power supplies, used in conjunction with Lambda Systems. Power Sequencer or Systems Power Protector, must be specified with the "S" option.

ACCESSORIES

Rack Adapter	Rack adapters LRA-8, LRA-10, LRA-11, LRA-12, or LRA-13 with or without chassis slides are available.
Overvoltage Protector	Externally mounted, Overvoltage Protectors LM-OV-1, LM-OV-2 and LM-OV-3 are available for use with Lambda LCS-A-2 through LCS-A-48 power supplies. On models LCS-A-01 through LCS-A-04, use overvoltage protectors LH-OV-4, LH-OV-5 and LH-OV-6.
Control Panel	All LCS-A power supplies may be obtained with a Systems Power Control Panel, SP-3 or SP-5. This unit, mounted on rack adapters LRA-8, LRA-10 or LRA-11, and used with a Systems Cable or Auxiliary Cable, provides an on-off switch, voltage control and pilot light.
Metering Panel	A Systems Metering Panel, SMP-3 or SMP-5 may be used in conjunction with the LCS-A power supplies. The panel, mounted in rack adapters LRA-8, LRA-10 or LRA-11, and used with a Systems Cable contains a voltmeter and an ammeter, each with three ranges and a push button selector switch. The selector switch allows monitoring of the voltage and current of any of up to 8 outputs.

THEORY OF OPERATION

GENERAL

The Lambda power supply consists of an AC input circuit and transformer; a bias supply consisting of an auxiliary rectifier and filter, and pre-regulator*; a main regulator circuit consisting of the main rectifier and filter, a series regulator, emitter follower driver, a current comparator*, a voltage comparator*, an amplifier*, current and voltage sensing networks and a voltage reference circuit*.

* This circuit element is part of integrated circuit (IC1) in the supply.

The circuit arrangement is shown in block diagram form, Figure 10. The circuitry is discussed with reference to the block diagram and the schematic diagram.

FUNCTIONAL DESCRIPTION

Single phase input power is applied to transformer T1 through the input circuit which contains a thermostat to protect the supply against over heating.

The main rectifier, a full wave rectifier, provides the power which is filtered by capacitor C6 and then regulated via a series regulator and delivered to the output. Half-wave auxiliary rectifier CR1 provides voltage filtered by capacitor C1 for the preregulator located in IC1. The reference element, powered by the preregulator, provides a reference voltage for the current comparator and the voltage comparator.

Constant voltage circuit operation is determined by changes in the load which cause a change in one input to the voltage comparator. A second input to comparator is a reference voltage that is developed by a constant current of 1 milliampere flowing in divider element R8. The comparator compares the output voltage change with the reference voltage resulting in an error signal at the output of the comparator.

The error signal from the comparator is then current amplified by driver Q1 and (as applicable, Q3) which controls the voltage across the series regulator Q2. Q2 functions as the active regulating element in the supply.

* Current limit circuit operation for models LCS-A-01 through LCS-A-05 is determined by changes in the load. The current comparator samples load current through current sensing resistor R22. When the voltage drop across R22 increases to the preset voltage reference is determined by R6 and R9, the current comparator conducts. Thus, when the output current rating of the unit is exceeded, the current comparator conducts, decreasing the current through driver Q1 (and as applicable, Q3) resulting in an increase of voltage across the series regulator and a decrease of the output voltage, effectively limiting the output current to a safe value. The current limit value is determined by fixed resistors R6, R22 and R9.

* The following theory applies to models LCS-A-2 through LCS-A-150.

Current limit circuit operation is determined by changes in the load. When load current increases above the rated current vlaue, the voltage drop across current limit resistor R2 increases causing the amplifier to turn on. With the amplifier conducting the current to driver Q1 (or as applicable, Q3), decreases, limiting the base current to series regulator Q2 which results in an increase of voltage across the series regulator and a decrease of the output voltage, effectively

limiting the output current to a safe value. The current limit value is determined by fixed resistors R6, R9, R21, R22 and R23.

When operating conditions reach short circuit, the output voltage value decreases to zero and the current decreases to a predetermined current limit value and remains unchanged.

OPERATING INSTRUCTIONS

BASIC MODE OF OPERATION

This power supply operates as a constant voltage source provided the load current does not exceed the rated value at 40°C. For continuous operation, load current must not exceed the rating for each ambient temperature and will remain limited to less than 140% of 40°C rating.

CONNECTIONS FOR OPERATION

NOTE: Make all connections to the unit before applying AC input power.

Ground Connections. The Lambda power supply can be operated either with negative or positive output terminal grounded. Both positive and negative ground connections are shown in the diagrams for all suggested output connections illustrated in this manual.

Connection Terminals. Make all connections to the supply at the terminal block on the rear of the supply. Apply input power to terminals 1 and 2; always connect the ungrounded (hot) lead to terminal 1.

The supply positive terminal is brought out to terminal 6. The supply negative terminal is brought out to terminal 4. Recommended wiring of the power supply to the load and selection of wiring is shown in figures 1 through 9. Selection of proper wiring is made on the basis of load requirements. Make all performance checks and measurements of current or voltage at the rear output terminals. Connect measuring devices directly to terminals or use the shortest leads possible.

SUPPLY LOAD CONNECTIONS

Connections For Operation as a Constant Voltage Source

The output impedance and regulation of the power supply at the load may change when using the supply as a constant voltage source and connecting leads of practical length are used. To minimize the effect of the output leads on these characteristics, remote sensing is used. Recommended types of supply-load connections with local or remote sensing are described in the following paragraphs.

Refer to figure 1 to determine voltage drop for particular cable length, wire size and current conditions. Lead lengths must be measured from supply terminals to load terminals as shown in figure 2.

Two-Wire Connection, Figure 3. The two-wire connection, with local sensing, is the connection suitable for applications with relatively constant load.

Four-Wire Connection, Figure 4. The four-wire connection with remote sensing, provides complete compensation for the DC voltage drops in the connecting cables. Sensing leads should be a twisted pair to minimize AC pick-up.

Programmed Voltage Connections, Using External Resistor, Figure 5. Discrete voltage steps can be programmed with a resistance voltage divider valued at 1000 ohms/volt and a shorting-type switch as shown in Figure 5. When continuous voltage variations are required, use a variable resistor with the same 1000 ohms/volt ratio in place of the resistive voltage divider and shorting-type switch. Use a low temperature coefficient resistor to assure most stable operation.

Before programming, adjust programming resistor for zero resistance and set voltage adjust control to the minimum rated output voltage.

As shown in figure 5, voltages can be programmed utilizing either local or remote sensing connections, as desired.

Programmed Voltage Connections Using Programming Voltage, Figure 6. The power supply voltage output can be programmed with an externally connected programming power supply. The output voltage of the programmed supply will maintain a one-to-one ratio with the voltage of the programming supply if the output voltage control of the programmed supply is set to minimum output voltage.

The programming supply must have a reverse current capability of 1.5 ma. minimum.

Alternatively, when supplies with less than 1.5 ma reverse current capability are used, a resistor capable of drawing 1.5 ma at the minimum programming voltage must be connected across the output terminals of the supply. This programming supply must be rated to handle all excess resistor current at the maximum programming voltage.

Connections For Series Operation

The voltage capability of LCS-A power supplies can be extended by series operation. A maximum of 300 volts can be connected between either the +DC or -DC terminal and chassis ground with a maximum voltage capability of 300 volts possible for model LCS-A-150.

Figure 7, and as applicable, 7A, shows the connections for either local or remote sensing in a series connection where the voltage control of each unit functions independently to control the output.

Figure 7 applies only to the LCS-A-01 through LCS-A-05 power supplies. If a common load is used, the maximum current rating of the unit with the lower current rating must not be exceeded.

Figure 7A shows the series connection applicable to the LCS-A-2 through LCS-A-150 power supplies. A diode, having a current carrying capability equal to or greater than the maximum current rating of the supply, must be used and connected as shown in figure 7A. The diode blocking voltage should be at least twice the maximum rated output voltage of the supply. See table I, of "Specifications and Features", for power supply current and voltage ratings.

Connections For Parallel Operation (Applicable only to LCS-A-01——LCS-A-05)

The current capability of LCS-A power supplies can be extended by parallel operation of LCS-A power supplies of equal* voltage capacities. Units "M" and "S" are shown connected for parallel operation in figures 8 and 9. One power supply designated the "M" unit controls its own output as well as the output of the second power supply, designated the "S" unit.

* For applications using supplies of unequal voltage ratings, consult factory for details of operation.

Unit S operates to regulate its current in a ratio to that of the M unit by comparing the current in its internal sampling resistor with that current sampled by the master internal sampling resistor.

CAUTION: Always set "S" unit voltage control to zero (fully CCW) during parallel operation, otherwise excessive current will flow through "M" unit voltage control.

OPERATION AFTER PROTECTIVE DEVICE SHUTDOWN

Thermostat Shutdown

The thermostat opens the input circuit only when the temperature of the internal heat sink exceeds a maximum safe value. The thermostat will automatically reset when the temperature of the heat sink decreases to a safe operating value. After eliminating the cause(s) for overheating and allowing time for the power supply to cool to a proper temperature, resume operation of the supply.

Fuse Shutdown

Fuses will blow when the maximum rated current value for the fuse is exceeded. Fatigue failure of fuses can occur when mechanical vibrations from the installation combine with thermally induced stresses to weaken the fuse metal. Many fuse failures are caused by a temporary condition and replacing the blown fuse will make the fuse protected circuit operative. When the LCS-A supply is used with the overvoltage protector option fuse F1 will provide load protection against internal component failure.

MAINTENANCE

GENERAL

This section describes trouble analysis routine, replacement procedures, calibration and test procedures that are useful for servicing the Lambda LCS-A power supply. A trouble chart is provided as an aid for the troubleshooter. Refer to the section on specifications and features for the minimum performance standards.

TROUBLE ANALYSIS

Whenever trouble occurs, systematically check fuse, primary power lines, external circuit elements, and external wiring for malfunction before trouble shooting the equipment. Failures and malfunctions often can be traced to simple causes such as improper jumper and supply-load connections or fuse failure due to metal fatigue.

Use the electrical schematic diagram and block diagram, figure 11, as an aid to locating trouble causes. The schematic diagram contains various circuit voltages that are averages for normal operation. Measure these voltages using the conditions for measurement specified on the schematic diagram. Use measuring probes carefully to avoid causing short circuits and damaging circuit components.

CHECKING TRANSISTORS AND CAPACITORS

Check transistors with an instrument that has a highly limited current capability. Observe proper polarity to avoid error in measurement. The forward transistor resistance is low but never zero; backward resistance is always higher than the forward resistance.

For good transistors, the forward resistance for any junction is <u>always</u> greater than zero.

Do not assume trouble is eliminated when only one part is replaced. This is especially true when one transistor fails, causing other transistors to fail. Replacing only one transistor and turning power on, before checking for additional defective components could damage the replaced component.

When soldering semi-conductor devices, wherever possible, hold the lead being soldered with a pair of pliers placed between the component and the solder joint to provide an effective heat sink.

> <u>NOTE</u>: The leakage resistance obtained from a simple resistance check of a capacitor is not always an indication of a faulty capacitor. In all cases the capacitors are shunted with resistances, some of which have low values. Only a dead short is a true indication of a shorted capacitor.

PRINTED CIRCUIT BOARD MAINTENANCE TECHNIQUES

1. If foil is intact but not covered with solder, it is a good contact. Do not attempt to cover with solder.

2. Voltage measurements can be made from either side of the board. Use a needlepoint probe to penetrate to the wiring whenever a protective coating is used

on the wiring. A brass probe can be soldered to an alligator clip adapted to the measuring instrument.

3. Wherever possible use a heat sink when soldering transistors.

4. Broken or damaged printed wiring is usually the result of an imperfection, strain or careless soldering. To repair small breaks, tin a short piece of hook-up wire to bridge the break, and holding the wire in place, flow solder along the length of wire so that it becomes part of the circuitry.

5. When unsoldering components from the board never pry or force loose the part; unsolder the component by using the wicking process described below:

(a) Select a 3/16 inch tinned copper braid for use as a wick; if braid is not available, select AWG No. 14 or No. 16 stranded wire with 1/2 inch insulation removed.

(b) Dip the wick in liquid rosin flux.

(c) Place the wick onto the soldered connection and apply soldering iron onto the wick.

(d) When sufficient amount of solder flows onto the wick, freeing the component, simultaneously remove iron and wick.

TROUBLE CHART

The trouble chart is intended as a guide for locating trouble causes, and is used along with the schematic diagram.

The operating conditions assumed for the trouble chart are as follows:

(a) AC power of proper voltage and frequency is preset at input terminals.

(b) Either positive or negative terminal is connected to chassis ground.

(c) The power supply is connected for constant voltage with local sensing. See schematic; dotted lines indicate jumpers connected for local sensing operation.

TROUBLE SHOOTING CHART

Symptom	Probable Cause	Remedy
1. Zero volts DC output	OUTPUT VOLTAGE control turned fully CCW	Check OUTPUT VOLTAGE control for proper setting and correct as necessary
	Short circuit across output of supply	Check load and load connections, correct as necessary

TROUBLE SHOOTING CHART (Cont'd)

Symptom	Probable Cause	Remedy
1. Zero volts DC output (Cont'd.)	F1 open	Replace F1; if it blows immediately, check shorted diode CR7, transistors Q1, Q2 and, as applicable, Q3 and capacitors C7, C15; replace as necessary
	Series regulator section open	Check Q2 for open, replace as necessary
	Open CR6, or as applicable, CR15	Check CR6 or CR15 for open, replace as necessary
	Current sensing resistor open	Check R22 for open, R6 for short
	Aux. rectifier CR1 open	Check CR1 for open; replace as necessary
	Open CR8, CR9 (as applicable) or R1	Check and replace as necessary
2. Unable to adjust output voltage	Damaged OUTPUT VOLTAGE control	Check R8 for short and/or open, replace as necessary
3. High ripple at line frequency or twice line frequency and unregulated DC output	Series regulator transistors shorted	Check and replace as necessary; Q1, Q2 and, as applicable, Q3
	Defective main rectifier causes ripple at twice line frequency	Check for open and/or short CR2, CR3, CR4 and CR5.
4. Same as 3, except intermittent	Foreign matter fallen into unit	Check for loose bench hardware and wire clippings that may have fallen through cover
5. High ripple at frequency other than line or twice line frequency	Oscillation due to defective component in filter network	Check for open C7, C2 and check for open and/or short in C11 and R2. Replace defective component
6. Large spikes at output	Capacitor C5, or as applicable, C4 and C14, open	Replace C5 (or C4 and C14)

PERFORMANCE CHECKS

Check the ripple and regulation of the power supply using the test connection diagram shown in figure 11. Use suggested test equipment or equivalent to obtain accurate results. Refer to SPECIFICATIONS AND FEATURES for minimum performance standards.

Set the differential meter, DC VTVM (John Fluke Model 801H or equivalent) to the selected power supply operating voltage. Check the power supply load regulation accuracy while switching from the load to no-load condition. Long load leads should be a twisted pair to minimize AC pick-up.

Use a Variac to vary the line voltage from 105-132 or 132-105 volts AC and check the power-supply line regulation accuracy on the VTVM differential meter.

Use a VTVM, Ballantine 320 or equivalent, to measure rms ripple voltage of the power supply DC output. Use oscilloscope to measure peak-to-peak ripple voltage of the power supply DC output.

SERVICE

When additional instructions are required or repair service is desired, contact the nearest office of the Lambda Electronics Corp. where trained personnel and complete facilities are ready to assist you.

Please include the power supply model and serial number together with complete details of the problem. On receipt of this information, Lambda will supply service data or advise shipping for factory repair service.

All repairs not covered by the warranty will be billed at cost and an estimate forwarded for approval before work is started.

PARTS ORDERING

Standard components and special components used in the Lambda power supply can be obtained from the factory. In case of emergency, critical spare parts are available through any Lambda office.

The following information must be included when ordering parts:

1. Model number and serial number of power supply and purchase date.
2. Lambda part number.
3. Description of part together with circuit designation.
4. If part is not an electronic part, or is not listed, provide a description, function and location of the part.

PARTS LIST

The electrical parts located on Lambda models LCS-A-2 — LCS-A-150 and LCS-A-01—LCS-A-05 are listed here. Parts common to a group of models are listed first. Unique parts of individual models within the group are listed separately, by model, immediately following the group common-parts listing. In addition there are separate listings of parts for the "V" option and SP-3, SP-5, SMP-3, SMP-5, LMOV, and LHOV accessories.

COMMON PARTS

MODELS LCSA-2 — LCS-A-8 AND LCS-A-01

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
C1	Cap., elect, 40 mf -10 + 100%, 25 vdc	CBP-40-036	1.20
C2	Cap., mylar, 0.047 mf ±10%, 80 vdc	CGL-47-013	.50
C3	Not assigned		
C4	Cap., mylar, 0.22 mf ±10%, 200 vdc	CGM-22-002	.50
C5	Not assigned		
C7	Cap., elect., 280 mf -10 +100%, 35 vdc	CBR-28-038	1.77
C8	Not assigned		
C9	Cap., elect., 2 mf -10 +100%, 100 vdc	CBN-20-024	1.20
C10	Cap., mylar, 0.033 mf ±10%, 400 vdc	CGL-33-009	.50
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
C12, C13	Not assigned		
C14	Same as C4		
C15	Cap., mylar, 0.047 mf ±10%, 200 vdc	CGL-47-018	.39
C16	Cap., mylar, 0.1 mf ±10%, 200 vdc	CAM-10-012	.65
CR1	Rectifier	FBL-00-030	1.40
CR2	Not assigned		
CR3, CR4	Rectifier	FBL-00-092	1.26
CR5, CR6	Not assigned		
CR8, CR10	Same as CR1		
CR11	Rectifier, zener diode	FBM-Z119	.85
CR12	Not assigned		
CR13	Same as CR1		
CR14, CR16 thru CR21	Not assigned		
CR22†	Rectifier, zener diode	FBM-Z139	.27
IC1*	Integrated circuit	FBT-00-031	9.75

COMMON PARTS (Cont)

MODELS LCSA-2 — LCS-A-8 AND LCS-A-01 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
Q1	Transistor, NPN	FBN-L113	$1.96
Q2	Transistor, NPN	FBN-36485	4.13
Q3	Same as Q1		
R1	Res., film, 8,660 ohms ±1%, 1/4 w	DCS-87-071	.25
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R5	Res., comp., 470 ohms ±10%, 1/4 w	DCB-4711	.10
R7	Not assigned		
R9	Res., film, 10,000 ohms ±1%, 1/4 w	DCT-10-047	.20
R10*	Res., comp., 36 meg-ohms ±5%, 1/4 w	DCB-3665	.19
R11	Not assigned		
R12	Res., comp., 68,000 ohms ±10%, 1/4 w	DCB-6831	.06
R13 thru R15	Not assigned		
R16	Res., comp., 1,200 ohms ±10%, 1/4 w	DCB-1221	.10
R17 thru R19	Not assigned		
XF1	Fuseholder	HRM-00-016	.33

*On units bearing serial no. prefix A, IC1 is FBT-00-010, $10.00: and R10 is 68 megohms ±10%, DCB-6861, $.15

†CR22 not used on units with serial no. prefixes A-C.

UNIQUE PARTS
MODEL LCS-A-2

C6	Cap., elect., 3,500 mf -10+100%, 15 vdc	CBS-35-079	2.64
CR7, CR9, CR15	Not assigned		
F1	Fuse, 6 A, 8 AG, NORM-BLO	FFR-06-000	.13
R3	Res., comp., 1,500 ohms ±10%, ½ w	DEB-1521	.12

UNIQUE PARTS (Cont)
MODEL LCS-A-2 (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
R4	Res., comp., 1,000 ohms ±10%, ½ w	DEB-1021	$ .12
R6	Res., film, 105 ohms ±1%, ¼ w	DCR-11-039	.35
R8	Res., var., ww, 2,000 ohms ±10%, 1 w	DNS-20-034	3.00
R20	Res., film, 1,470 ohms ±1%, ¼ w	DCS-15-056	.45
R21	Res., film, 4,700 ohms ±2%, ¼w	DCS-47-074	.20
R22	Res., ww, 0.166 ohm ±5%, 5 w	DFM-17-071	.66
R23	Res., film, 1,000 ohms ±1%, ¼ w	DCS-10-055	.15
P24	Res., comp., 4,700 ohms ±10%, ¼ w	DCB-4721	.10
T1	Transformer	ABA-CSA-2	20.05

MODEL LCS-A-3

C6	Cap., elect., 3,500 mf -10 + 100%, 15 vdc	CBS-35-079	2.64
CR7, CR9, CR15	Not assigned		
F1	Fuse, 6A, 8AG, NORM-BLO	FFR-06-000	.13
R3	Res., comp., 1,500 ohms ±10%, 1/2 w	DEB-1521	.12
R4	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221	.12
R6	Res., film, 187 ohms ±1%, 1/4 w	DCR-19-060	.17
R8	Res., var., ww, 2,000 ohms ±10%, 1 w	DNS-20-034	3.00
R20	Res., film, 2,400 ohms ±2%, 1/4 w	DCS-24-068	.19
R21	Res., film, 7,150 ohms ±1%, 1/4 w	DCS-72-053	.15
R22	Res., ww, 0.166 ohm ±5%, 5 w	DFM-17-071	.66
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-3P6A	19.62

MODEL LCS-A-3P6

C6	Cap., elect., 3,500 mf -10 +100%, 15 vdc	CBS-35-079	2.64
CR7, CR9, CR15	Not assigned		
F1	Fuse, 6A, 8AG, NORM-BLO	FFR-06-000	.13
R3	Res., comp., 1,500 ohms ±10%, 1/2 w	DEB-1521	.12
R4	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221	.12
R6	Res., film, 187 ohms ±1%, 1/4 w	DCR-19-060	.17
R8	Res., var., ww, 5,000 ohms ±10%, 1 w	DNS-50-036	3.15
R20	Res., film, 2,400 ohms ±2%, 1/4 w	DCS-24-068	.19
R21	Res., film, 9,090 ohms ±1%, 1/4 w	DCS-91-054	.15
R22	Res., ww, 0.166 ohm ±5%, 5 w	DFM-17-071	.66
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-3P6A	19.62

UNIQUE PARTS (Cont)
MODEL LCS-A-4

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
C6	Cap., elect., 3,500 mf -10 + 100%, 15 vdc	CBS-35-079	$ 2.64
CR7, CR9, CR15	Not assigned		
F1	Fuse 6A, 8AG, NORM-BLO	FFR-06-000	.13
R3	Res., comp., 1,500 ohms ±10%, 1/2 w	DEB-1521	.12
R4	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221	.12
R6	Res., film, 187 ohms ±1%, 1/4 w	DCR-19-060	.17
R8	Res., var., ww, 5,000 ohms ±10%, 1 w	DNS-50-036	3.15
R20	Res., film, 3,000 ohms ±5%, 1/4 w	DCS-30-058	.18
R21	Res., film, 10,000 ohms ±1%, 1/4 w	DCT-10-047	.20
R22	Res., ww, 0.166 ohm ±5%, 5 w	DFM-17-071	.66
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-4P5A	19.50

MODEL LCS-A-4P5

C6	Cap., elect., 3,500 mf -10 + 100%, 15 vdc	CBS-35-079	2.64
CR7, CR9, CR15	Not assigned		
F1	Fuse, 6A, 8AG, NORM-BLO	FFR-06-000	.13
R3	Res., comp., 1,500 ohms ±10%, 1/2 w	DEB-1521	.12
R4	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221	.12
R6	Res., film, 182 ohms ±1%, 1/4 w	DCR-18-059	.15
R8	Res., var., ww, 5,000 ohms ±10%, 1 w	DNS-50-036	3.15
R20	Res., film, 3,000 ohms ±5%, 1/4 w	DCS-30-058	.18
R21	Res., film, 11,800 ohms ±1%, 1/4 w	DCT-12-066	.60
R22	Res., ww, 0.166 ohm ±5%, 5 w	DFM-17-071	.66
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-4P5A	19.50

MODEL LCS-A-5

C6	Cap., elect., 2,500 mf -10 + 100%, 20 vdc	CBS-25-080	2.52
CR7, CR9, CR15	Not assigned		
F1	Fuse, 6A, 8AG, NORM-BLO	FFR-06-000	.13
R3	Res., comp., 1,500 ohms ±10%, 1/2 w	DEB-1521	.12
R4	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221	.12
R6	Res., film, 215 ohms ±1%, 1/4 w	DCR-22-050	.45
R8	Res., var., ww, 5,000 ohms ±10%, 1 w	DNS-50-036	3.15

UNIQUE PARTS (Cont)
MODEL LCS-A-5 (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
R20	Res., film, 3,600 ohms ±5%, 1/4 w	DCS-36-080	$ .12
R21	Res., film, 10,500 ohms ±1%, 1/4 w	DCT-11-065	.17
R22	Res., ww, 0.21 ohm ±5%, 5 w	DFM-21-072	.75
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-5A	19.74

MODEL LCS-A-6

C6	Cap., elect., 2,500 mf -10 + 100%, 20 vdc	CBS-25-080	2.52
CR7, CR9, CR15	Not assigned		
F1	Fuse, 6A, 8AG, NORM-BLO	FFR-06-000	.13
R3	Res., comp., 1,500 ohms ±10%, 1/2 w	DEB-1521	.12
R4	Res., comp., 3,900 ohms ±10%, 1/2 w	DEB-3921	.12
R6	Res., film, 215 ohms ±1%, 1/4 w	DCR-22-050	.45
R8	Res., var., ww, 5,000 ohms ±10%, 1 w	DNS-50-036	3.15
R20	Res., film, 4,700 ohms ±2%, 1/4 w	DCS-47-074	.13
R21	Res., film, 13,300 ohms ±1%, 1/4 w	DCT-13-067	.18
R22	Res., ww, 0.21 ohm ±5%, 5w	DFM-21-072	.75
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-6A	19.83

MODEL LCS-A-8

C6	Cap., elect., 2,500 mf -10 + 100%, 20 vdc	CBS-25-080	2.52
CR7, CR9, CR15	Not assigned		
F1	Fuse, 5A, 8AG, NORM-BLO	FFR-05-000	.11
R3	Res., comp., 4,700 ohms ±10%, 1/2 w	DEB-4721	.12
R4	Res., comp., 3,900 ohms ±10%, 1/2 w	DEB-3921	.12
R6	Res., film, 210 ohms ±1%, 1/4 w	DCR-21-064	.45
R8	Res., var., ww, 5,000 ohms ±10%, 1 w	DNS-50-036	3.15
R20	Res., film, 6,800 ohms ±2%, 1/4 w	DCS-68-032	.30
R21	Res., film, 18,200 ohms ±1%, 1/4 w	DCT-18-068	.45
R22	Res., ww, 0.21 ohm ±5%, 5w	DFM-21-072	.75
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-8A	19.77

UNIQUE PARTS (Cont.)
MODEL LCS-A-01

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
C6	Cap., elect., 2,500 mf -10 + 100%, 20 vdc	CBS-25-080	$ 2.52
CR7	Rectifier	FBL-00-063	1.10
CR9	Rectifier	FBL-00-030	1.40
CR15	Rectifier	FBL-00-092	1.26
F1	Fuse, 5A, 8AG, NORM-BLO	FFR-05-000	.11
R3	Res., comp., 1,500 ohms ±10%, 1/2 w	DEB-1521	.12
R4	Res., ww, 750 ohms ±5%, 3 w	DFR-75-085	.51
R6	Res., film, 332 ohms ±1%, 1/4 w	DCR-33-042	.35
R8	Res., var., cermet, 9,000 ohms ±10%, 0.75 w	DRS-90-003	4.40
R20	Not assigned		
R21	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
R22	Res., ww, 0.125 ohm ±5%, 3 w	DFM-15-066	.78
R23	Not assigned		
R24	Res., comp., 100,000 ohms ±10%, 1/4 w	DCB-1041	.06
T1	Transformer	ABA-CSA-6A	19.83

COMMON PARTS

MODELS LCS-A-10 —LCS-A-48
AND LCS-A-02 —LCS-A-04

C1	Cap., elect., 40 mf -10 + 75%, 25 vdc	CBP-40-036	1.20
C2	Cap., mylar, 0.047 mf ±10%, 80 vdc	CGL-47-013	.50
C3, C4	Not assigned		
C5	Cap., mylar, 0.1 mf ±10%, 200 vdc	CAM-10-012	.65
C8	Not assigned		
C9	Cap., elect., 2 mf -10 + 100%, 100 vdc	CBN-20-024	1.20
C10	Cap., mylar, 0.033 mf ±10%, 400 vdc	CGL-33-009	.50
C12 thru C14	Not assigned		
C15	Cap., mylar, 0.047 mf ±10%, 200 vdc	CGL-47-018	.39
C16	Same as C5		
CR1, CR10	Rectifier	FBL-00-030	1.40
CR11	Rectifier, zener diode	FBM-Z119	.85
CR12	Not assigned		
CR13	Same as CR1		
CR14 thru CR21	Not assigned		
CR22†	Rectifier, zener diode	FBM-Z139	.27
IC1*	Integrated circuit	FBT-00-031	9.75
R1	Res., film, 8,660 ohms ±1%, 1/4 w	DCS-87-071	.25
R5	Res., comp., 470 ohms ±10%, 1/4 w	DCB-4711	.10
R7	Not assigned		
R9	Res., film, 10,000 ohms ±1%, 1/4 w	DCT-10-047	.20
R10*	Res., comp., 36 megohms ±5%, 1/4 w	DCB-3665	.19
R11	Not assigned		

COMMON PARTS (Cont.)
MODELS LCS-A-10 — LCS-A-48
AND LCS-A-02 — LCS-A-04 (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
R12	Res., comp., 68,000 ohms ±10%, 1/4 w	DCB-6831	$ .06
R13 thru R15	Not assigned		
R16	Res., comp., 1,200 ohms ±10%, 1/4 w	DCB-1221	.10
R17 thru R19	Not assigned		
XF1	Fuseholder	HRM-00-016	.33

*On units bearing serial no. prefix A, IC1 is FBT-00-010, $ 10.00: and R10 is 68 megohms ±10%, DCB-6861, $ .15

†CR22 not used on units with serial no. prefixes A-C.

UNIQUE PARTS
MODEL LCS-A-10

C6	Cap., elect., 1,700 mf -10 + 100%, 30 vdc	CBS-17-081	2.52
C7	Cap., elect., 280 mf -10 + 100%, 35 vdc	CBR-28-038	1.74
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR5	Rectifier	FBL-00-092	1.26
CR6. CR7	Not assigned		
CR8	Rectifier	FBL-00-030	1.40
CR9	Not assigned	FFR-05-000	.11
F1	Fuse, 5A, 8AG, NORM-BLO	FBN-L113	1.96
Q1	Transistor, NPN	FBN-36485	4.13
Q2	Transistor, NPN		
Q3	Same as Q1	DCB-2211	.06
R2	Res., comp., 220 ohms ±10%, 1/4 w	DEB-4721	.10
R3	Res., comp., 4,700 ohms ±10%, 1/2 w	DEB-3921	.12
R4	Res., comp., 3,900 ohms ±10%, 1/2 w	DCR-19-061	.42
R6	Res., film, 191 ohms ±1%, 1/4 w	DNS-50-036	3.15
R8	Res., var., ww, 5,000 ohms ±10%, 1 w	DCS-82-061	.16
R20	Res., film, 8,200 ohms ±5%, 1/4 w	DCT-26-069	.45
R21	Res., film, 26,100 ohms ±1%, 1/4 w	DFM-21-072	.75
R22	Res., ww, 0.21 ohm ±5%, 5 w	DCS-10-055	.15
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCB-4721	.10
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	ABA-CSA-10A	19.59
T1	Transformer		

MODEL LCS-A-12

C6	Cap., elect., 1,700 mf -10 + 100%, 30 vdc	CBS-17-081	2.52
C7	Cap., elect., 280 mf -10 + 100%, 35 vdc	CBR-28-038	1.44
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR5	Rectifier	FBL-00-092	1.26

UNIQUE PARTS (Cont)
MODEL LCS-A-12 (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
CR6. CR7	Not assigned		
CR8	Rectifier	FBL-00-030	$ 1.40
CR9	Not assigned		
F1	Fuse, 5 A, 8AG, NORM-BLO	FFR-05-000	.11
Q1	Transistor, NPN	FBN-L113	1.96
Q2	Transistor, NPN	FBN-36485	4.13
Q3	Same as Q1		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 4,700 ohms ±10%, 1/2 w	DEB-4721	.10
R4	Res., comp., 8,200 ohms ±10%, 1/2 w	DEB-8221	.12
R6	Res., film, 196 ohms ±1%, 1/4 w	DCR-20-062	.16
R8	Res., var., cermet, 9,000 ohms ±10%, 0.75 w	DRS-90-003	4.40
R20	Res., film, 9,100 ohms ±2%, 1/4 w	DCS-91-050	.50
R21	Res., film, 30,900 ohms ±1%, 1/4 w	DCT-31-070	.16
R22	Res., ww, 0.25 ohm ±5%, 5 w	DFM-25-016	1.30
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-12A	20.01

MODEL LCS-A-15

C6	Cap., elect., 1,700 mf -10 + 100%, 30 vdc	CBS-17-081	2.52
C7	Cap., elect., 160 mf -10 + 100%, 60 vdc	CBR-16-039	2.00
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR5	Rectifier	FBL-00-092	1.26
CR6. CR7	Not assigned		
CR8	Rectifier	FBL-00-030	1.40
CR9	Not assigned		
F1	Fuse, 5A, 8AG, NORM-BLO	FFR-05-000	.11
Q1	Transistor, NPN	FBN-L113	1.96
Q2	Transistor, NPN	FBN-36485	4.13
Q3	Same as Q1		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 4,700 ohms ±10%, 1/2 w	DEB-4721	.10
R4	Res., comp., 8,200 ohms ±10%, 1/2 w	DEB-8221	.12
R6	Res., film, 187 ohms ±1%, 1/4 w	DCR-19-060	.16
R8	Res., var., cermet, 9,000 ohms ±10%, 0.75 w	DRS-90-003	4.40
R20	Res., film, 9,100 ohms ±2%, 1/4 w	DCS-91-050	.50
R21	Res., film, 40,200 ohms ±1%, 1/4 w	DCT-40-058	.16
R22	Res., ww, 0.25 ohm ±5%, 5 w	DFM-25-016	1.30
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-15A	19.59

UNIQUE PARTS (Cont)
MODEL LCS-A-18

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
C6	Cap., elect., 1,200 mf -10 + 100%, 40 vdc	CBS-12-082	$ 2.52
C7	Cap., elect., 160 mf -10 + 100%, 60 vdc	CBR-16-039	2.00
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR5	Rectifier	FBL-00-092	1.26
CR6, CR7	Not assigned		
CR8	Rectifier	FBL-00-030	1.40
CR9	Not assigned		
F1	Fuse, 5A, 8AG, NORM-BLO	FFR-05-000	.11
Q1	Transistor, NPN	FBN-L109	2.25
Q2	Transistor, NPN	FBN-36220	2.85
Q3	Same as Q1		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 10,000 ohms ±10%, 1/2 w	DEB-1031	.12
R4	Res., comp., 8,200 ohms ±10%, 1/2 w	DEB-8221	.12
R6	Res., film, 249 ohms ±1%, 1/4 w	DCR-25-034	.50
R8	Res., var., ww, 20,000 ohms ±10%, 1 w	DNT-20-010	2.85
R20	Res., film, 12,000 ohms ±1%, 1/4 w	DCT-12-052	.12
R21	Res., film, 34,800 ohms ±1%, 1/4 w	DCT-34-071	.45
R22	Res., ww, 0.39 ohm ±5%, 5w	DFM-39-046	1.81
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-18A	19.80

MODEL LCS-A-20

C6	Cap., elect., 1,200 mf -10 + 100%, 40 vdc	CBS-12-082	2.52
C7	Cap., elect., 160 mf -10 + 100%, 60 vdc	CBR-16-039	2.00
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR5	Rectifier	FBL-00-092	1.26
CR6, CR7	Not assigned		
CR8	Rectifier	FBL-00-030	1.40
CR9	Not assigned		
F1	Fuse, 3A, 8AG NORM-BLO	FFR-03-000	.18
Q1	Transistor, NPN	FBN-L109	2.25
Q2	Transistor, NPN	FBN-36220	2.85
Q3	Same as Q1		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 10,000 ohms ±10%, 1/2 w	DEB-1031	.12
R4	Res., comp., 8,200 ohms ±10%, 1/2 w	DEB-8221	.12
R6	Res., film, 221 ohms ±1%, 1/4 w	DCR-22-065	.45

UNIQUE PARTS (Cont)
MODEL LCS-A-20 (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
R8	Res., var., ww, 20,000 ohms ±10%, 1 w	DNT-20-010	$ 2.85
R20	Res., film, 15,000 ohms ±5%, 1/4 w	DCT-15-062	.15
R21	Res., film, 44,200 ohms ±1%, 1/4 w	DCT-44-073	.45
R22	Res., ww, 0.39 ohm ±5%, 5 w	DFM-39-046	1.81
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-20A	19.59

MODEL LCS-A-24

C6	Cap., elect., 950 mf -10 + 100%, 50 vdc	CBR-95-093	2.52
C7	Cap., elect., 90 mf -10 + 100%, 85 vdc	CBP-90-010	3.00
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR5	Rectifier	FBL-00-092	1.26
CR6, CR7	Not assigned		
CR8	Rectifier	FBL-00-030	1.40
CR9	Not assigned		
F1	Fuse, 3A, 8AG, NORM-BLO	FFR-03-000	.18
Q1	Transistor, NPN	FBN-L109	2.25
Q2	Transistor, NPN	FBN-36220	2.85
Q3	Same as Q1		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 10,000 ohms ±10%, 1/2 w	DEB-1031	.12
R4	Res., comp., 18,000 ohms ±10%, 1/2 w	DEB-1831	.12
R6	Res., film, 178 ohms ±1%, 1/4 w	DCR-18-058	.16
R8	Res., var., ww, 20,000 ohms ±10%, 1 w	DNT-20-010	2.85
R20	Res., film, 18,000 ohms ±1%, 1/4 w	DCT-18-059	.15
R21	Res., film, 66,500 ohms ±1%, 1/4 w	DCT-67-074	.18
R22	Res., ww, 0.39 ohm ±5%, 5 w	DFM-39-046	1.81
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-24A	19.74

MODEL LCS-A-28

C6	Cap., elect., 950 mf -10 + 100%, 50 vdc	CBR-95-093	2.52
C7	Cap., elect., 90 mf -10 + 100%, 85 vdc	CBP-90-010	3.00
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR5	Rectifier	FBL-00-092	1.26
CR6, CR7	Not assigned		

UNIQUE PARTS (Cont)

MODEL LCS-A-28 (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
CR8	Rectifier	FBL-00-030	$1.40
CR9	Not Assigned		
F1	Fuse, 3A, 8AG, NORM-BLO	FFR-03-000	.18
Q1	Transistor, NPN	FBN-L109	2.25
Q2	Transistor, NPN	FBN-36220	2.85
Q3	Same as Q1		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 33,000 ohms ±10%, 1/2 w	DEB-3331	.12
R4	Res., comp., 18,000 ohms ±10%, 1/2 w	DEB-1831	.12
R6	Res., film, 205 ohms ±1%, 1/4 w	DCR-20-063	.15
R8	Res., var., ww, 20,000 ohms ±10%, 1 w	DNT-20-010	2.85
R20	Res., film, 22,000 ohms ±5%, 1/4 w	DCT-22-050	.30
R21	Res., film, 66,500 ohms ±1%, 1/4 w	DCT-67-074	.18
R22	Res., ww, 0.5 ohm ±5%, 5 w	DFM-50-073	.50
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-28A	19.65

MODEL LCS-A-36

C6	Cap., elect., 400 mf -10 + 100%, 100 vdc	CBR-40-094	3.00
C7	Cap., elect., 90 mf -10 + 100%, 85 vdc	CBP-90-010	3.00
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR5	Rectifier	FBL-00-094	.99
CR6, CR7	Not assigned		
CR8	Rectifier	FBL-00-030	1.40
CR9	Not assigned		
F1	Fuse; 3A, 8AG, NORM-BLO	FFR-03-000	.18
Q1	Transistor, NPN	FBN-L108	2.52
Q2	Transistor, NPN	FBN-36487	5.63
Q3	Same as Q1		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 33,000 ohms ±10%, 1/2 w	DEB-3331	.12
R4	Res., comp., 18,000 ohms ±10%, 1/2 w	DEB-1831	.12
R6	Res., film, 191 ohms ±1%, 1/4 w	DCR-19-061	.42
R8	Res., var., ww, 20,000 ohms ±10%, 1 w	DNT-20-010	2.85
R20	Res., film, 27,000 ohms ±5%, 1/4 w	DCT-27-063	.30
R21	Res., film, 97,600 ohms ±1%, 1/4 w	DCT-98-075	.45
R22	Res., ww, 0.5 ohm ±5%, 5 w	DFM-50-073	.50
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-36A	19.68

MODEL LCS-A-48

C6	Cap., elect., 400 mf -10 + 100%, 100 vdc	CBR-40-094	3.00

UNIQUE PARTS (Cont)

MODEL LCS-A-48 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
C7	Cap., elect., 90 mf -10 + 100%, 85 vdc	CBP-90-010	$3.00
C11	Cap., mylar, 0.0047 mf ±10%, 200 vdc	CGK-47-002	.33
CR2 thru CR5	Rectifier	FBL-00-036	.60
CR6, CR7	Not assigned		
CR8	Rectifier	FBL-00-033	1.65
CR9	Not assigned		
F1	Fuse, 1 1/2A, 8AG, NORM-BLO	FFR-01-500	.11
Q1	Transistor, NPN	FBN-L108	2.52
Q2	Transistor, NPN	FBN-35902	6.15
Q3	Same as Q1		
R2	Res., comp., 330 ohms ±10%, 1/4 w	DCB-3311	.10
R3	Res., comp., 33,000 ohms ±10%, 1/2 w	DEB-3331	.12
R4	Res., comp., 18,000 ohms ±10%, 1/2 w	DEB-1831	.12
R6	Res., film, 150 ohms ±1%, 1/4 w	DCR-15-057	.17
R8	Res., var., cermet, 23,000 ohms ±10%, 0.75 w	DRT-23-008	4.40
R20	Res., film, 36,000 ohms ±5%, 1/4 w	DCT-36-060	.18
R21	Res., film, 174,000 ohms ±1%, 1/4 w	DCV-17-031	.42
R22	Res., ww, 0.56 ohm ±5%, 3 w	DFM-56-042	.50
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-48A	19.59

MODEL LCS-A-02

C6	Cap., elect., 1,200 mf -10 + 100%, 40 vdc	CBS-12-082	2.52
C7	Cap., elect., 90 mf -10 + 100%, 85 vdc	CBP-90-010	3.00
C11	Cap., mylar, 0.0033 mf ±10%, 200 vdc	CGK-33-003	.33
CR2 thru CR7	Rectifier	FBL-00-092	1.26
CR8, CR9	Rectifier	FBL-00-030	1.40
F1	Fuse, 3A, 8AG, NORM-BLO	FFR-03-000	.18
Q1	Transistor, NPN	FBN-L109	2.25
Q2	Transistor, NPN	FBN-36220	2.85
Q3	Same as Q1		
R2	Res., comp., 330 ohms ±10%, 1/4 w	DCB-3311	.10
R3	Res., comp., 4,700 ohms ±10%, 1/2 w	DEB-4721	.10
R4	Res., ww, 1,200 ohms ±3%, 3 w	DFS-12-016	.93
R6	Res., film, 280 ohms ±1%, 1/4 w	DCR-28-068	.42
R8	Res., var., cermet, 23,000 ohms ±10%	DRT-23-008	4.40
R20, R21	Not assigned		
R22	Res., ww, 0.21 ohm ±5%, 5 w	DFM-21-072	.75
R23	Not assigned		
R24	Res., comp., 100,000 ohms ±10%, 1/4 w	DCB-1041	.12
T1	Transformer	ABA-CSA-15A	19.59

UNIQUE PARTS (Cont)
MODEL LCS-A-03

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
	MODEL LCS-A-03		
C6	Cap., elect., 950 mf -10 + 100%, 50 vdc	CBR-95-093	$ 2.52
C7	Cap., elect., 90 mf -10 + 100%, 85 vdc	CBP-90-010	3.00
C11	Cap., mylar, 0.0047 mf ±10%, 200 vdc	CGK-47-002	.33
CR2 thru CR5	Rectifier	FBL-00-036	.60
CR6 thru CR9	Rectifier	FBL-00-030	1.40
F1	Fuse, 3A, 8AG, NORM-BLO	FFR-03-000	.18
Q1	Transistor, NPN	FBN-L108	2.52
Q2	Transistor, NPN	FBN-36487	5.63
Q3	Same as Q1		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 10,000 ohms ±10%, 1/2 w	DEB-1031	.12
R4	Res., ww, 2,500 ohms ±3%, 3 w	DFS-25-036	.53
R6	Res., film, 182 ohms ±1%, 1/4 w	DCR-18-059	.15
R8	Res., var., cermet, 40,000 ohms ±10%, 0.75 w	DRT-40-009	4.40
R20, R21	Not assigned		
R22	Res., ww, 0.21 ohm ±5%, 5 w	DFM-21-072	.75
R23	Not assigned		
R24	Res., comp., 100,000 ohms ±10%, 1/4 w	DCB-1041	.12
T1	Transformer	ABA-CSA-28A	19.65
	MODEL LCS-A-04		
C6	Cap., elect., 400 mf -10 + 100%, 100 vdc	CBR-40-094	2.52
C7	Cap., elect., 25 mf -10 + 100%, 250 vdc	CBP-25-016	1.75
C11	Cap., mylar, 0.0022 mf ±10%, 80 vdc	CGK-22-008	.25
CR2 thru CR5	Rectifier	FBL-00-033	1.65
CR6, CR7	Rectifier	FBL-00-036	.60
CR8	Same as CR2		
CR9	Same as CR6		
F1	Fuse 1-1/2A, 8AG, NORM-BLO	FFR-01-500	.11
Q1	Transistor, NPN	FBN-L108	2.52
Q2	Transistor, NPN	FBN-35902	6.15
Q3	Same as Q3		
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 33,000 ohms ±10%, 1/2 w	DEB-3331	.12
R4	Res., ww, 5,600 ohms ±3%, 3 w	DFS-56-053	.60
R6	Res., film, 226 ohms ±1%, 1/4 w	DCR-23-066	.45
R8	Res., var., cermet, 75,000 ohms ±10%, 0.75 w	DRT-75-010	4.40
R20 R21	Not assigned		

UNIQUE PARTS (Cont.)
MODEL LCS-A-04 (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
R22	Res., ww, 0.5 ohm ±5%, 5 w	DFM-50-073	$ .50
R23	Not assigned		
R24	Res., comp., 100,000 ohms ±10%, 1/4 w	DCB-1041	.12
T1	Transformer	ABA-CSA-04A	18.96

COMMON PARTS
MODELS LCS-A-100 — LCS-A-150
AND LCS-A-05

C1	Cap., elect., 40 mf -10 + 100%, 25 vdc	CBP-40-036	1.20
C2	Cap., mylar, 0.047 mf ±10%, 80 vdc	CGL-47-013	.50
C3, C4	Not assigned		
C5	Cap., mylar, 0.0033 mf ±10%, 400 vdc	CGL-33-009	.50
C7	Cap., elect., 25 mf -10 + 100%, 250 vdc	CBP-25-016	1.75
C8	Not assigned		
C9	Cap., elect., 3.3 mf -10 + 100%, 250 vdc	CBN-33-027	2.70
C10	Same as C5		
C11	Cap., mylar, 0.0022 mf ±10%, 200 vdc	CGK-22-008	.25
C12 thru C14	Not assigned		
C15	Cap., mylar, 0.015 mf ±10%, 400 vdc	CGL-15-007	.50
C16	Cap., mylar, 0.1 mf ±10%, 200 vdc	CAM-10-012	.65
CR1	Rectifier	FBL-00-030	1.40
CR8	Rectifier	FBL-00-033	1.65
CR10	Same as CR1		
CR11	Rectifier, zener diode	FBM-Z119	.85
CR12	Not assigned		
CR13	Same as CR1		
CR14 thru CR21	Not assigned		
CR22†	Rectifier, zener diode	FBM-Z139,	.27
IC1*	Integrated circuit	FBT-00-031	9.75
Q1	Transistor, NPN	FBN-L115	2.75
Q2	Transistor, NPN	FBN-38982	12.60
R1	Res., film, 8,660 ohms ±1%, 1/4 w	DCS-87-071	.25
R2	Res., comp., 220 ohms ±10%, 1/4 w	DCB-2211	.06
R3	Res., comp., 120,000 ohms ±10%, 1/2 w	DEB-1241	.12
R5	Res., comp., 820 ohms ±10%, 1/4 w	DCB-8211	.06
R7	Not assigned		
R9	Res., film, 10,000 ohms ±1%, 1/4 w	DCT-10-047	.20
R10*	Res., comp., 36 megohms ±5%, 1/4 w	DCB-3665	.19
R11	Not assigned		
R12	Res., comp., 68,000 ohms ±10%, 1/4 w	DCB-6831	.06
R13 thru R19	Not assigned		
XF1	Fuseholder	HRM-00-016	.33

*On units bearing serial no. prefix A, IC1 is FBT-00-010, $ 10.00; and R10 is 68 megohms ±10%, DCB-6861, $ .15

†CR22 not used on units with serial no. prefixes A-C.

UNIQUE PARTS
MODEL LCS-A-100

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
C6	Cap., elect., 160 mf -10 + 100%, 200 vdc	CBR-16-096	$ 2.64
CR2 thru CR5	Rectifier	FBL-00-033	1.65
CR6, CR7, CR9	Not assigned		
F1	Fuse, 1/2A, 8AG, NORM-BLO	FFR-00-500	.33
R4	Res., comp., 68,000 ohms ±10%, 1/2 w	DEB-6831	.12
R6	Res., film, 287 ohms ±1%, 1/4 w	DCR-29-069	.16
R8	Res., var., cermet, 75,000 ohms ±10%, 0.75 w	DRT-75-010	4.40
R20	Res., film, 75,000 ohms ±5%, 1/4 w	DCT-75-064	.30
R21	Res., film, 165,000 ohms ±1%, 1/4 w	DCV-16-036	.27
R22	Res., ww, 4.0 ohms ±5%, 3 w	DFN-40-043	.66
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-100A	19.59

MODEL LCS-A-120

C6	Cap., elect., 160 mf -10 + 100%, 200 vdc	CBR-16-096	2.64
CR2 thru CR5	Rectifier	FBL-00-064	.75
CR6, CR7, CR9	Not assigned		
F1	Fuse, 1/2A, 8AG, NORM-BLO	FFR-00-500	.33
R4	Res., comp., 68,000 ohms ±10%, 1/2 w	DEB-6831	.12
R6	Res., film, 249 ohms ±1%, 1/4 w	DCR-25-034	.50
R8	Res., var., cermet, 75,000 ohms ±10%, 0.75 w	DRT-75-010	4.40
R20	Res., film, 91,000 ohms ±5%, 1/4 w	DCT-91-061	.18
R21	Res., film, 243,000 ohms ±1%, 1/4 w	DCV-24-033	.45
R22	Res., ww, 4.0 ohms ±5%, 3 w	DFN-40-043	.66
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-120A	19.77

MODEL LCS-A-150

C6	Cap., elect., 90 mf -10 + 100%, 300 vdc	CBP-90-068	2.64
CR2 thru CR5	Rectifier	FBL-00-064	.75
CR6, CR7, CR9	Not assigned		
F1	Fuse, 3/8A, 8AG, NORM-BLO	FFR-00-375	.30

UNIQUE PARTS (Cont.)
MODEL LCS-A-150 (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
R4	Res., comp., 68,000 ohms ±10%, 1/2 w	DEB-6831	$ .12
R6	Res., film, 261 ohms ±1%, 1/4 w	DCR-26-049	.45
R8	Res., var., cermet, 75,000 ohms ±10%, 0.75 w	DRT-75-010	4.40
R20	Res., film, 110,000 ohms ±5%, 1/4 w	DCV-11-030	.30
R21	Res., film, 294,000 ohms ±1%, 1/4 w	DCV-29-037	.27
R22	Res., ww, 6.2 ohms ±5%, 2 w	DFN-62-045	.50
R23	Res., film, 1,000 ohms ±1%, 1/4 w	DCS-10-055	.15
R24	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721	.10
T1	Transformer	ABA-CSA-150A	19.80

MODEL LCS-A-05

C6	Cap., elect., 160 mf -10 + 100%, 200 vdc	CBR-16-096	2.64
C17	Cap., mylar, 0.001 mf ±10%, 400 vdc	CGK-10-009	.46
C18	Cap., mylar, 0.0047 mf ±10%, 200 vdc	CGK-47-002	.33
CR2 thru CR5	Rectifier	FBL-00-064	.75
CR6, CR7, CR9	Rectifier	FBL-00-033	1.65
F1	Fuse, 3/8A, 8AG, NORM-BLO	FFR-00-375	.30
R4	Res., ww, 33,000 ohms ±5% , 5 w	DFT-33-051	.51
R6	Res., film, 243 ohms ±1%, 1/4 w	DCR-24-067	.45
R8	Res., var., cermet, 150,000 ohms ±10%, 0.75 w	DRV-15-006	4.26
R20, R21	Not assigned		
R22	Res., ww, 2.0 ohms ±2%, 3 w	DFN-20-079	.63
R23	Not assigned		
R24	Res., comp., 100,000 ohms ±10%, 1/4 w	DCB-1041	.06
T1	Transformer	ABA-CSA-120A	19.77

PARTS FOR "V" OPTION

On all LCS-A models with suffix "V", capacitor C10 and transformer T1 change. Part no. change for C10 is listed here. For transformer T1 used on these models, see standard LCS-A model parts list for the standard transformer part no. and add suffix "G"* to the part no. Price for T1 does not change.

* suffix "V" for serial no. prefixes A & B.

ALL MODELS

C10	Cap., mylar, 0.01 mf ±10%, 600 vdc	CGL-10-010	.50

PARTS FOR SYSTEMS
POWER CONTROL PANEL ACCESSORY
MODELS SP3, SP5

COMMON PARTS

QUANT.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
1	Cap., tant., 1.7 mf -15 + 75%, 150 vdc	CBN-17-031	$1.75
1	Pilot light, red neon	FCA-00-013	.85
1*	Res., comp., 47,000 ohms ±10%, 1/4 w	DCB-4731	.10
1†	Power "ON-OFF" switch	FDA-11-001	1.50
1**	Power "ON-OFF" switch	FDA-11-040	2.22

*On units with "V" option, this component is 150,000 ohms, part no. DCB-1541.
†Used on SP-3 only.
**Used on SP-5 only.

UNIQUE PARTS
MODEL LCS-A-3

1	Res., var., cermet, 2,200 ohms ±10%, 2 w	DRS-22-007	5.25
1	Res., meter shunt, 5A, 50 mV	ESN-50-002	4.50
1	Res., meter multiplier, film, 4,990 ohms ±1%, 1/4 w	DCS-50-063	.40

MODELS LCS-A-3P6 — LCS-A-4P5

1	Res., var., cermet, 4,500 ohms ±10%, 2 w	DRS-45-009	5.55
1	Res., meter shunt, 5 A 50 mV	ESN-50-002	4.50
1	Res., meter multiplier, film, 4,990 ohms ±1%, 1/4 w	DCS-50-063	.40

MODELS LCS-A-5 — LCS-A-8

1	Res., var., cermet, 4,500 ohms ±10%, 2 w	DRS-45-009	5.55
1	Res., meter shunt, 5 A, 50 mV	ESN-50-002	4.50
1	Res., meter multiplier, film, 10,000 ohms ±1%, 1/4 w	DCT-10-047	.20

MODEL LCS-A-10

1	Res., var., cermet, 9,000 ohms ±10%, 2 w	DRS-90-004	6.50
1	Res., meter shunt, 5A, 50 mV	ESN-50-002	4.50
1	Res., meter multiplier, film, 20,000 ohms ±1%, 1/4 w	DCT-20-053	.20

MODEL LCS-A-12

1	Res., var., cermet, 9,000 ohms ±10%, 2 w	DRS-90-004	6.50
1	Res., meter shunt, 2A, 50 mV	ESN-20-001	5.10
1	Res., meter multiplier, film, 20,000 ohms ±1%, 1/4 w	DCT-20-053	.20

MODELS LCS-A-15 — LCS-A-18

1	Res., var., cermet, 23,000 ohms ±10%, 2 w	DRT-23-018	7.95
1	Res., meter shunt, 2A, 50 mV	ESN-20-001	5.10
1	Res., meter multiplier, film, 20,000 ohms ±1%, 1/4 w	DCT-20-053	.20

UNIQUE PARTS (Cont)
MODELS LCS-A-20 AND LCS-A-24

QUANT.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
1	Res., var., cermet, 23,000 ohms ±10%, 2 w	DRT-23-018	$7.95
1	Res., meter shunt, 2A, 50 mV	ESN-20-001	5.10
1	Res., meter multiplier, film, 49,900 ohms ±1%, 1/4 w	DCT-50-054	.45

MODELS LCS-A-28 — LCS-A-48

1	Res., var., cermet, 23,000 ohms ±10%, 2 w	DRT-23-018	7.95
1	Res., meter shunt, ww, 0.05 ohm ±1%, 0.33 w	DEL-50-001	3.80
1	Res., meter multiplier, film, 49,900 ohms ±1%, 1/4 w	DCT-50-054	.45

MODELS LCS-A-100 AND LCS-A-120

1	Res., var., cermet, 75,000 ohms ±10%, 2 w	DRT-75-020	6.27
1	Res., meter shunt, ww, 0.251 ohm ±1%, 0.33 w	DEM-25-002	2.75
1	Res., meter multiplier, film, 200,000 ohms ±1%, 1/4 w	DCV-20-028	.50

MODEL LCS-A-150

1	Res., var., cermet, 75,000 ohms ±10%, 2 w	DRT-75-020	6.27
1	Res., meter shunt, ww, 0.505 ohm ±1%, 0.33 w	DEM-51-003	2.75
1	Res., meter multiplier, film, 200,000 ohms ±1%, 1/4 w	DCV-20-028	.50

MODEL LCS-A-01

1	Res., var., cermet, 9,000 ohms ±10%, 2 w	DRS-90-004	6.50
1	Res., meter shunt, 2A, 50 mV	ESN-20-001	5.10
1	Res., meter multiplier, film, 10,000 ohms ±1%, 1/4 w	DCT-10-047	.20

MODEL LCS-A-02

1	Res., var., comp., 27,000 ohms ±10%, 1/2 w	DMT-27-007	12.75
1	Res., meter shunt, 2A, 50 mV	ESN-20-001	5.10
1	Res., meter multiplier, film, 20,000 ohms ±1%, 1/4 w	DCT-20-053	.20

MODEL LCS-A-03

1	Res., var., comp., 40,000 ohms ±10%, 1/2 w	DMT-40-008	12.75
1	Res., meter shunt, ww, 0.05 ohm ±1%, 0.33 w	DEL-50-001	3.80
1	Res., meter multiplier, film, 49,900 ohms ±1%, 1/4 w	DCT-50-054	.45

MODEL LCS-A-04

1	Res., var., comp., 75,000 ohms ±10%, 1/2 w	DMT-75-009	12.75
1	Res., meter shunt, ww, 0.1 ohm ±1%, 0.33 w	DEM-10-001	2.75
1	Res., meter multiplier, film, 100,000 ohms ±1%, 1/4 w	DCV-10-027	.45

UNIQUE PARTS (Cont.)
MODEL LCS-A-05

QUANT.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
1	Res., var., comp., 150,000 ohms ±10%, 1/2 w	DMV-15-006	$12.75
1	Res., meter shunt, ww, 0.505 ohm ±1%, 0.33 w	DEM-51-003	2.75
1	Res., meter multiplier, 200,000 ohms ±1%, 1/4 w	DCV-20-028	.50

PARTS FOR SYSTEM METERING PANEL ACCESSORY
MODELS SMP-3, SMP-5

1	Voltmeter	EBP-27-039	25.00
1	Ammeter	EDN-12-033	25.00
2	Pushbutton switch assembly	FDK-08-001	12.25
1	Selector switch, 3 pole, double throw	FDA-32-026	5.75

PARTS FOR OVERVOLTAGE PROTECTOR ACCESSORY MODELS LMOV-1, LMOV-2, LMOV-3, LHOV-4, LHOV-5, LHOV-6

COMMON PARTS

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
C1	Cap., mylar, 0.01 mf ±20%, 80 vdc	CGL-10-008	.50
Q1	Transistor, NPN	FBN-L102	2.40
R3	Res., film, 200 ohms ±5%, 1/2 w	DCR-20-010	.20
R4	Res., thermister, 425 ohms ±5%, 1-1/4 w	DKR-43-004	1.52
R5, R6	Res., comp., 1,200 ohms ±10%, 1/2 w	DEB-1221	.12
R8	Res., comp., 15,000 ohms ±10%, 1/2 w	DEB-1531	.12
R10	Same as R5		
SCR1	Rectifier, silicon controlled	FBP-00-009	6.00

UNIQUE PARTS
MODEL LMOV-1

Q2	Transistor, PNP	FBN-L103	1.50
R1	Res., var., ww, 2,000 ohms ±10%, 1 w	DNS-20-034	3.00
R2	Res., film, 560 ohms ±2%, 1/2 w	DCR-56-002	.65
R7	Res., comp., 33 ohms ±5%, 1/4 w	DCB-3305	.15
R9	Not assigned		

PARTS FOR OVERVOLTAGE PROTECTOR ACCESSORY MODELS LMOV-1, LMOV-2, LMOV-3, LHOV-4, LHOV-5, LHOV-6 (Cont)

UNIQUE PARTS (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.	UNIT PRICE
	MODEL LMOV-2		
Q2	Transistor, PNP	FBN-L103	$1.50
R1	Res., var., ww, 5,000 ohms ±10%, 1 w	DNS-50-036	3.15
R2	Res., film, 1,470 ohms ±1%, 1/2 w	DCS-15-031	.30
R7	Res., comp., 33 ohms ±5%, 1/4 w	DCB-3305	.15
R9	Not assigned		
	MODEL LMOV-3		
Q2	Transistor, PNP	FBN-L114	3.50
R1	Res., var., ww, 20,000 ohms ±10%, 1 w	DNT-20-010	2.85
R2	Res., film, 4,700 ohms ±2%, 1/2 w	DCS-47-028	.30
R7	Res., comp., 39 ohms ±5%, 1/4 w	DCB-3905	.15
R9	Res., comp., 22 ohms ±10%, 1/2 w	DEB-2201	.12
	MODEL LHOV-4		
Q2	Transistor, PNP	FBN-L114	3.50
R1	Res., var., ww, 10,000 ohms ±10%, 1 w	DNT-10-045	3.75
R2	Res., film, 560 ohms ±2%, 1/2 w	DCR-56-002	.65
R7	Res., comp., 33 ohms ±5%, 1/4 w	DCB-3305	.15
R9	Res., comp., 22 ohms ±10%, 1/2 w	DEB-2201	.12
	MODEL LHOV-5		
Q2	Transistor, PNP	FBN-L114	3.50
R1	Res., var., ww, 20,000 ohms ±10%, 1 w	DNT-20-010	2.85
R2	Res., film, 560 ohms ±2%, 1/2 w	DCR-56-002	.65
R7	Res., comp., 33 ohms ±5%, 1/4 w	DCB-3305	.15
R9	Res., comp., 22 ohms ±10%, 1/2 w	DEB-2201	.12
	MODEL LHOV-6		
Q2	Transistor, PNP	FBN-L114	3.50
R1	Res., var., ww, 30,000 ohms ±10%, 0.6 w	DNT-30-027	9.90
R2	Res., film, 560 ohms ±2%, 1/2 w	DCR-56-002	.65
R7	Res., comp., 33 ohms ±5%, 1/4 w	DCB-3305	.15
R9	Res., comp., 22 ohms ±10%, 1/2 w	DEB-2201	.12

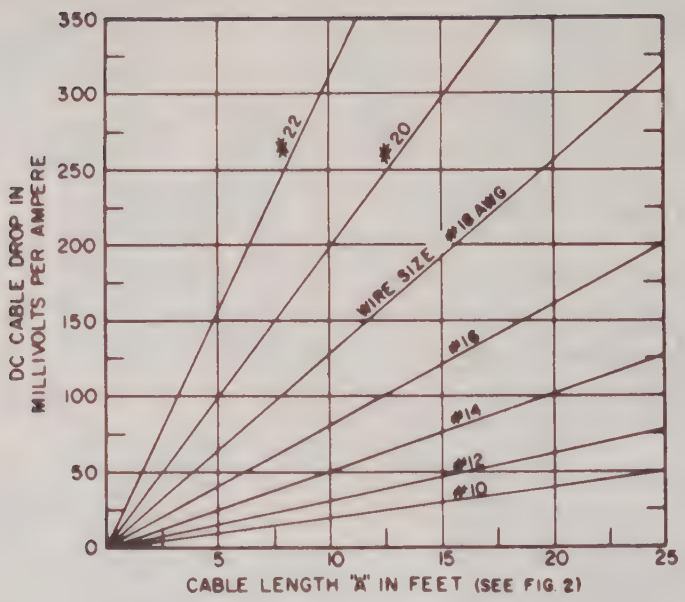


Figure 1. Cable Connection Chart

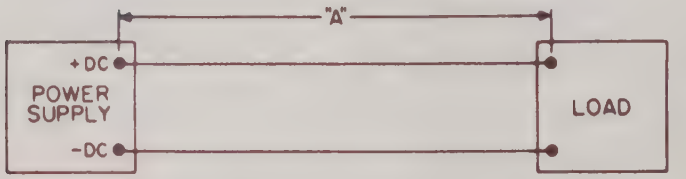
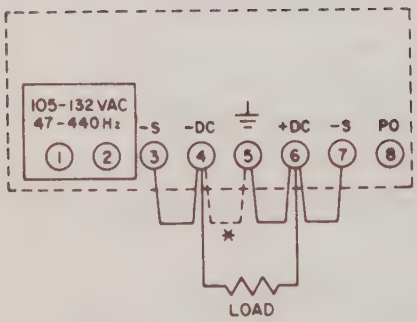
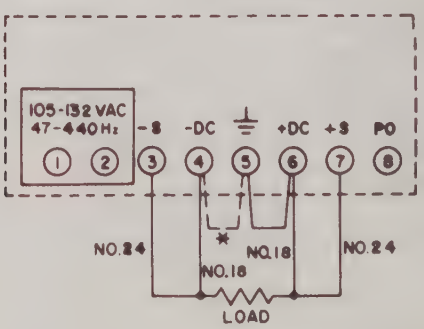


Figure 2. Cable Length "A" in Feet



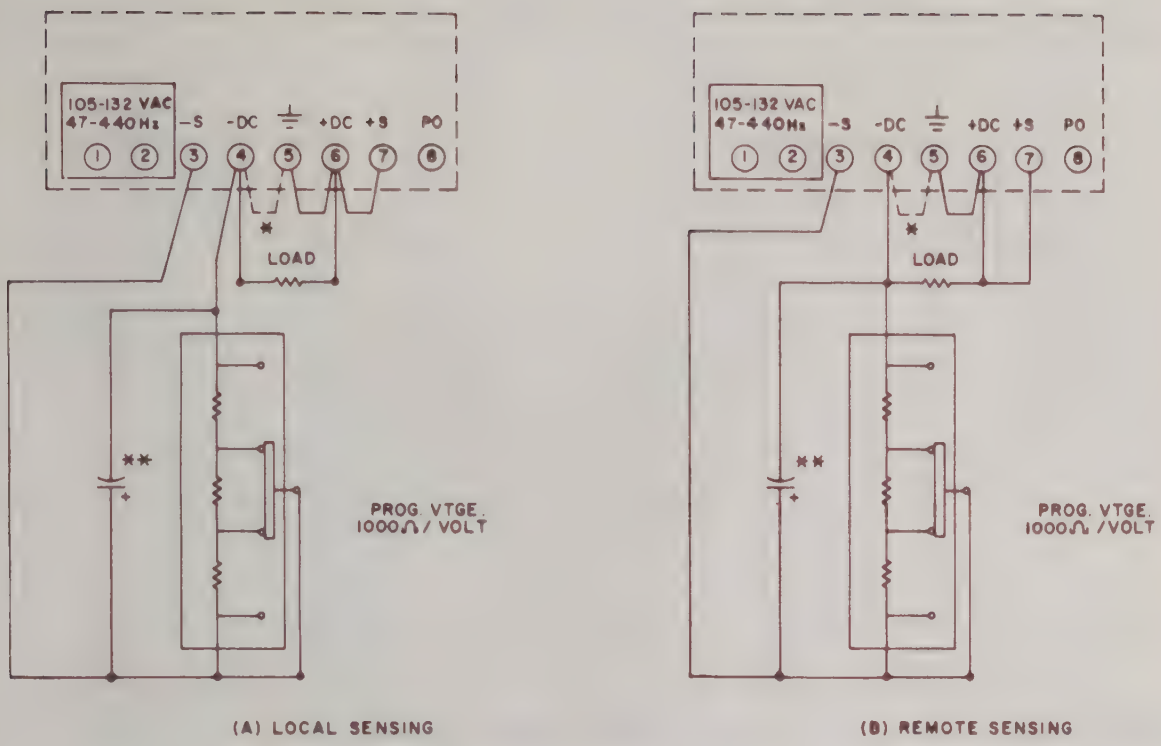
NOTE.
* FOR NEGATIVE GROUND, DISCONNECT JUMPER FROM TERMINALS 5 AND 6 AND RECONNECT TO TERMINALS 4 AND 5.

Figure 3. Two-Wire Connection



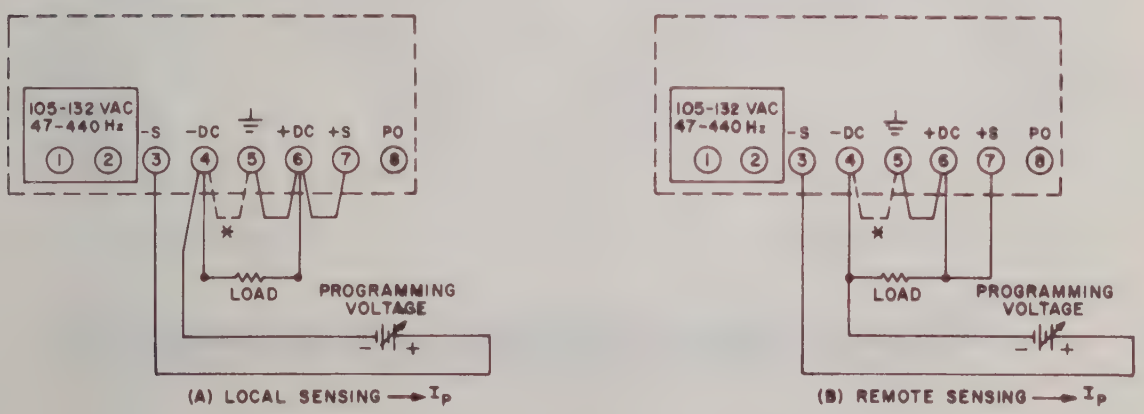
NOTE.
* FOR NEGATIVE GROUND, DISCONNECT JUMPER FROM TERMINALS 5 AND 6 AND RECONNECT TO TERMINALS 4 AND 5.

Figure 4. Four-Wire Connection



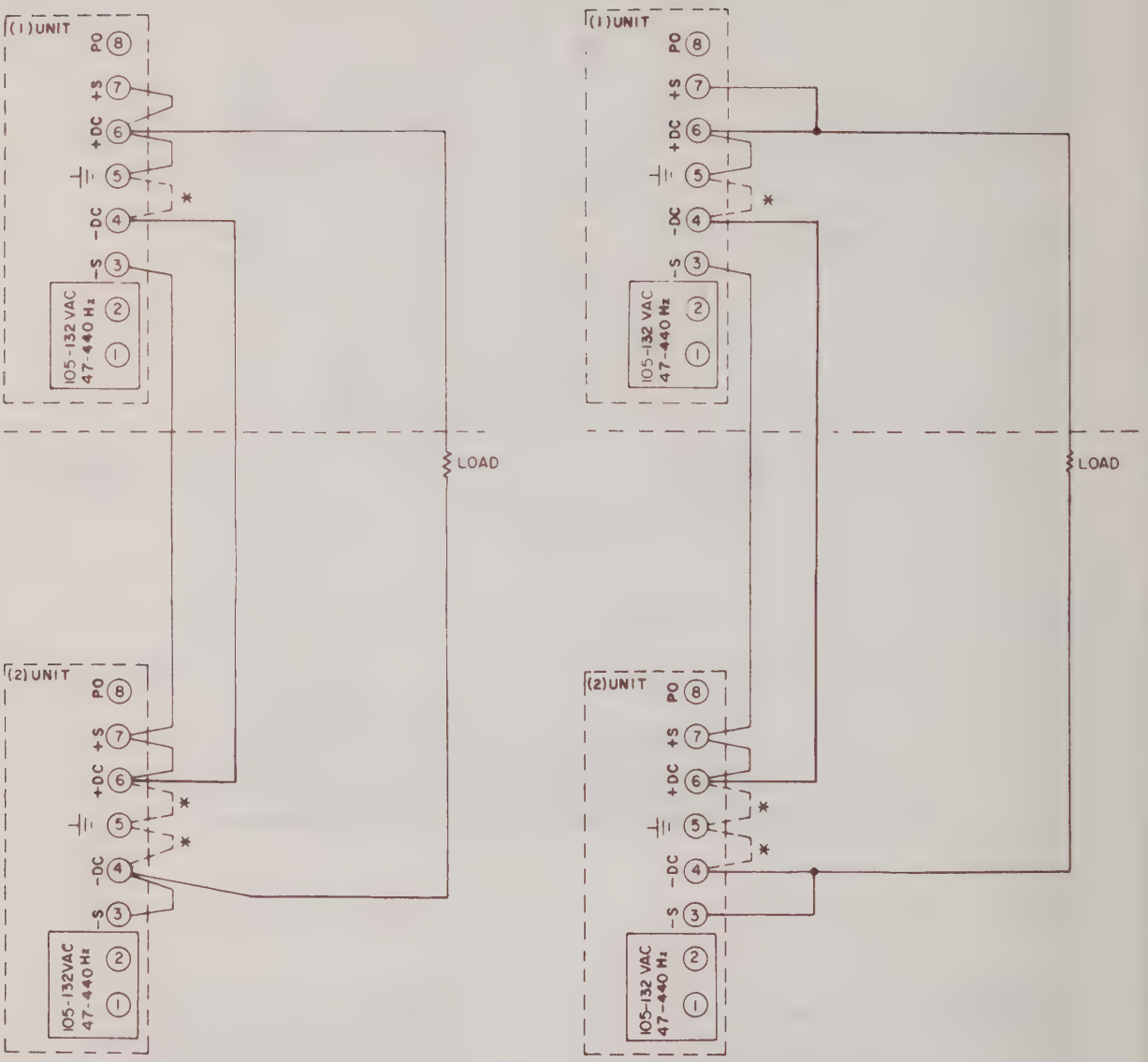
NOTE
* FOR NEGATIVE GROUND, DISCONNECT JUMPER FROM TERMINALS 5 AND 6 AND RECONNECT TO TERMINALS 4 AND 5.
** 2.5MF, 200V USED IN LCS-A-01 — LCS-A-04, LCS-A-3 — LCS-A-48
1.4MF, 400V USED ON LCS-A-05, LCS-A-100 — LCS-A-150

Figure 5. Programmed Voltage, With External Resistor



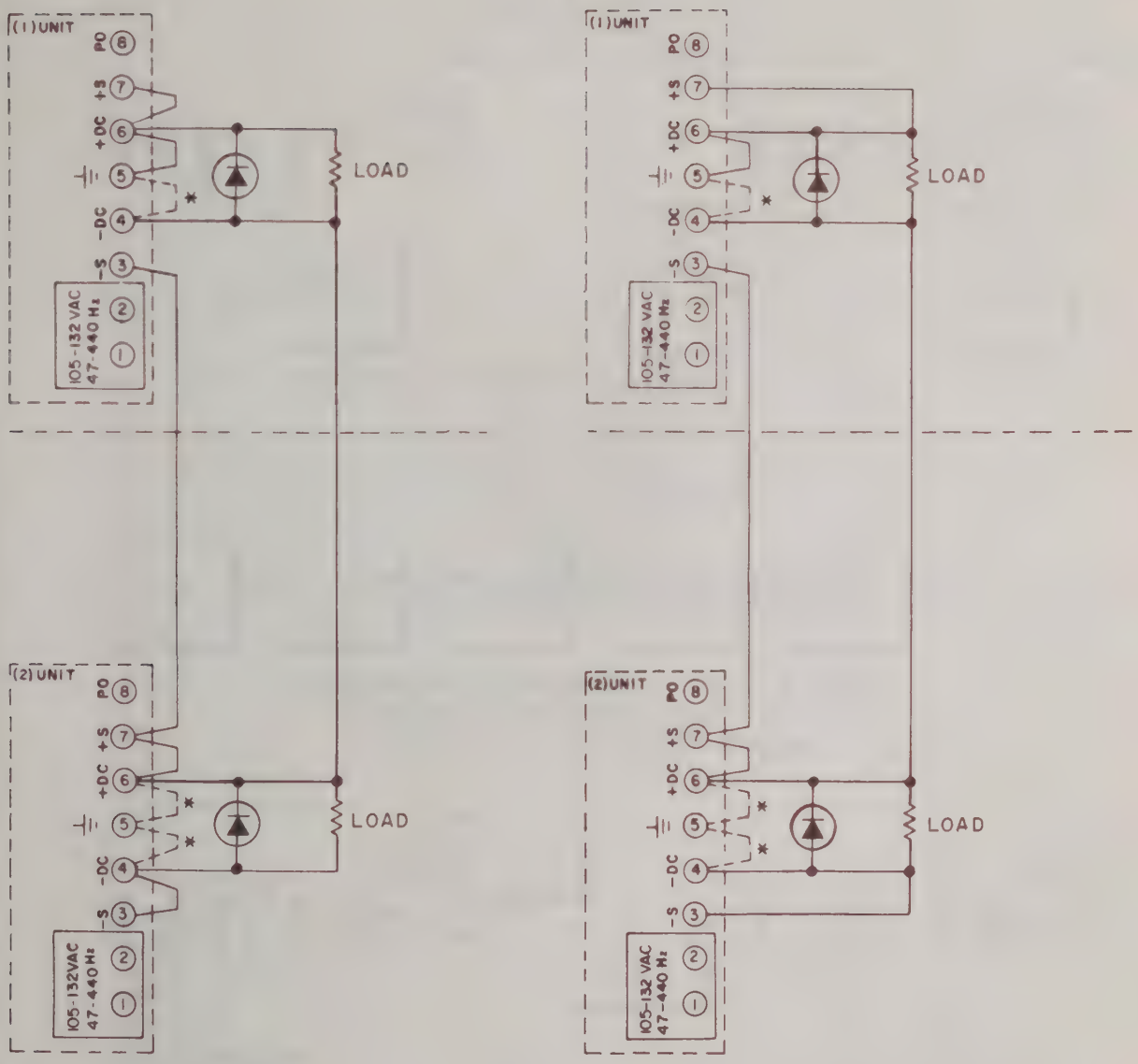
NOTE:
* FOR NEGATIVE GROUND, DISCONNECT JUMPER FROM TERMINALS 5 AND 6 AND RECONNECT TO TERMINALS 4 AND 5.

Figure 6. Programmed Voltage, With External Programming Voltage Source



NOTE:
* MAKE ONLY ONE GROUND CONNECTION FOR THE SERIES COMBINATION; TO CHANGE GROUND AS SHOWN, REMOVE JUMPER FROM TERMINALS 5 AND 6 ON (M) UNIT AND CONNECT ANY ONE OF THE OTHER JUMPERS AS SHOWN IN DOTTED LINE.

Figure 7. Series Connection, LCS-A-01 thru LCS-A-05 Only, Common Load



NOTE:
* MAKE ONLY ONE GROUND CONNECTION FOR THE SERIES COMBINATION; TO CHANGE GROUND AS SHOWN, REMOVE JUMPER FROM TERMINALS 5 AND 6 ON (M) UNIT AND CONNECT ANY ONE OF THE OTHER JUMPERS AS SHOWN IN DOTTED LINE.

Figure 7A. Series Connection (Diodes Not Required For LCS-A-01 thru LCS-A-05), Dual Load

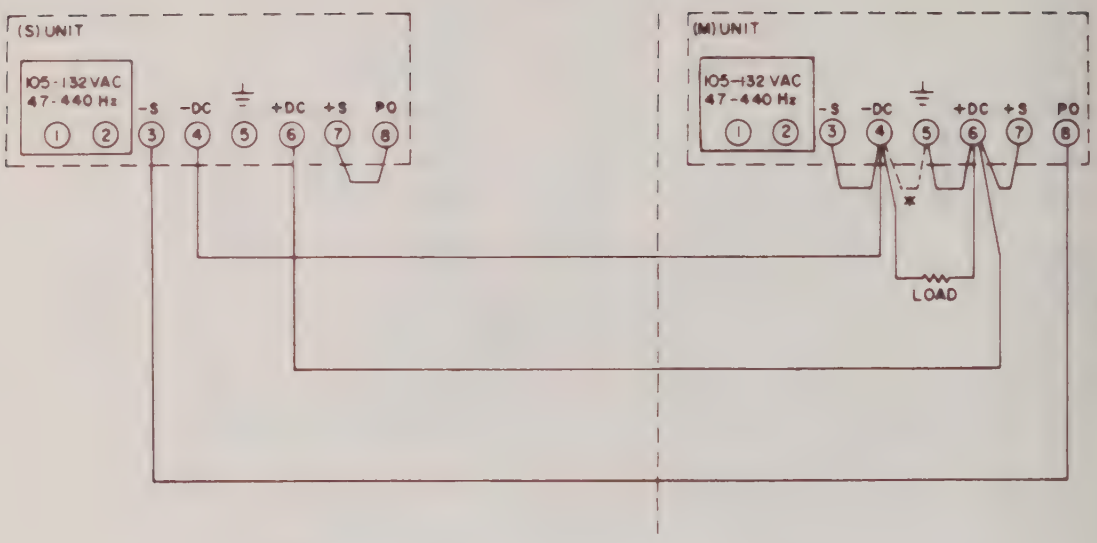


Figure 8. Parallel Connection, Local Sensing, LCS-A-01 — LCS-A-05 Only

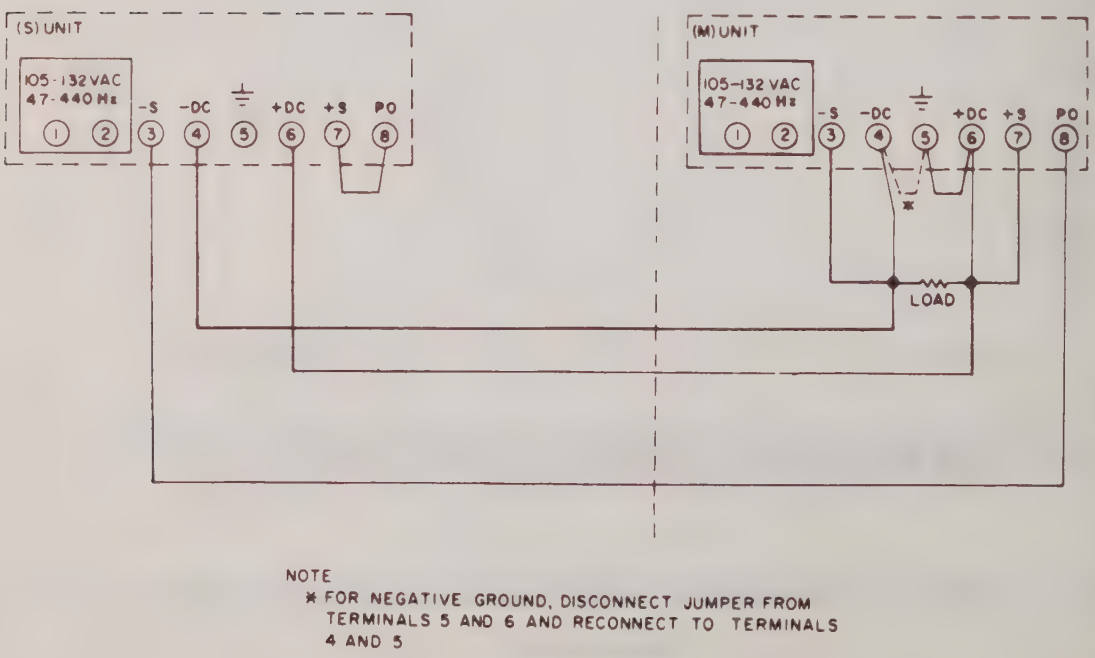
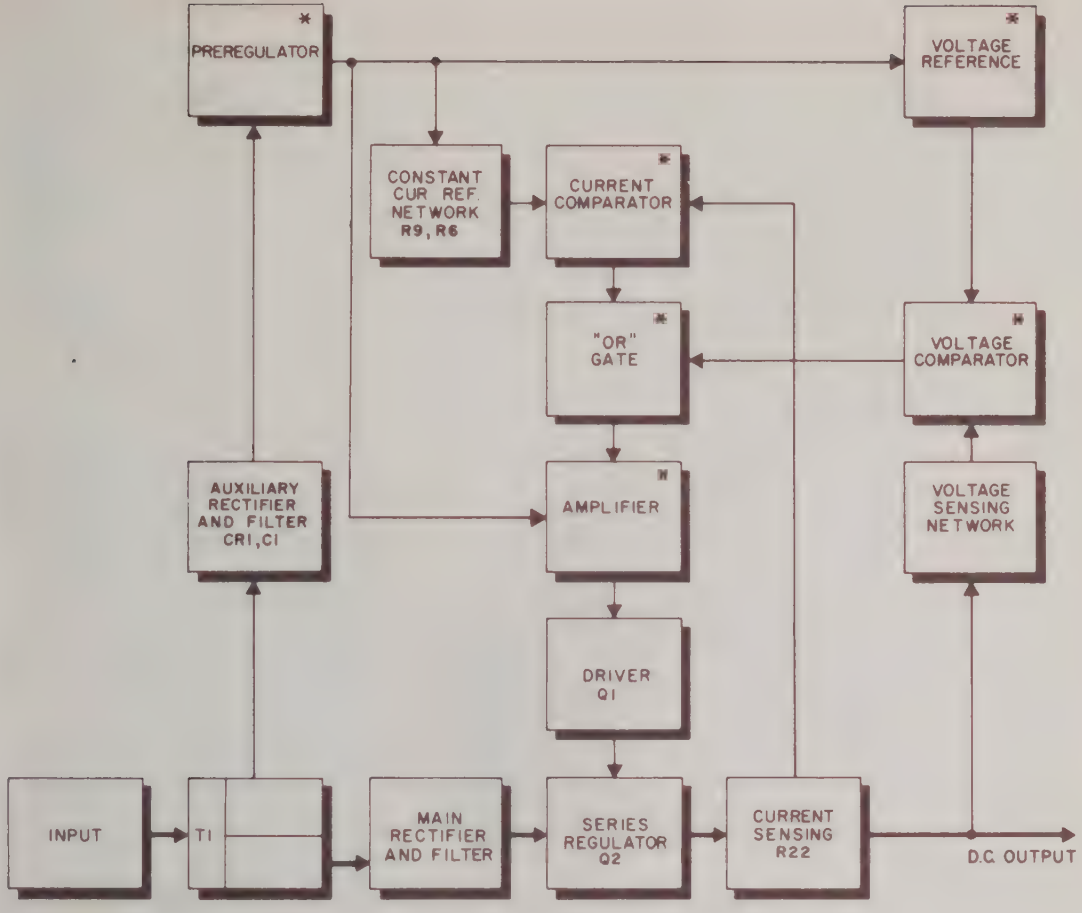
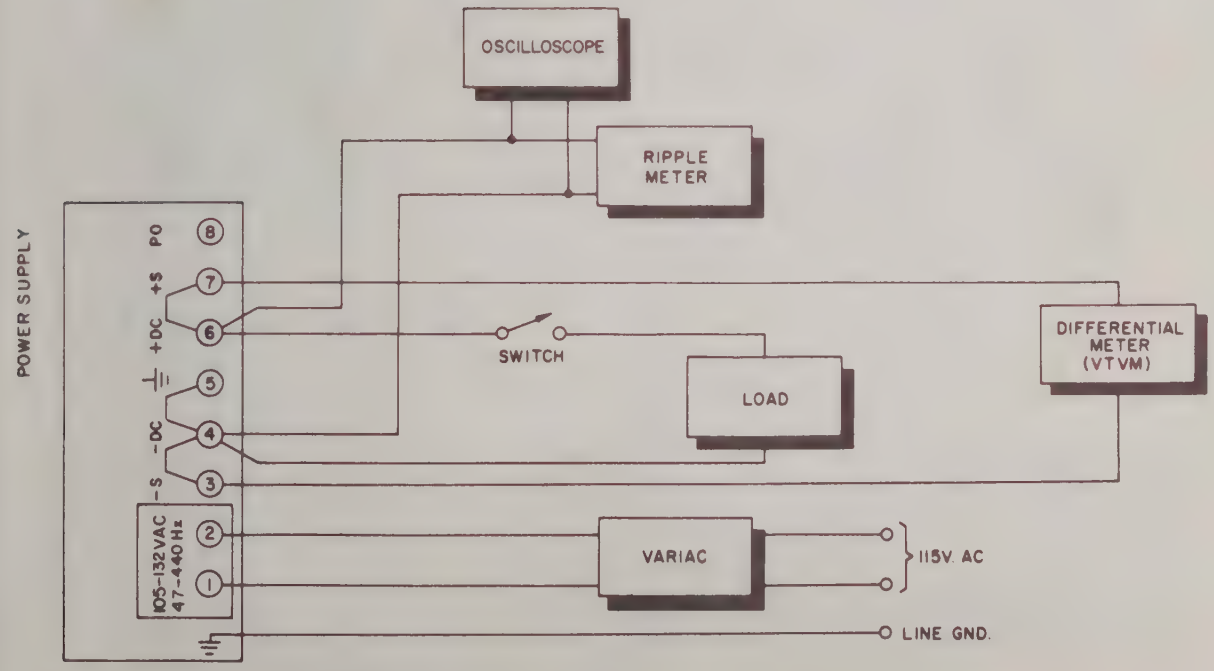


Figure 9. Parallel Connection, Remote Sensing, LCS-A-01 — LCS-A-05 Only



* THIS CIRCUIT ELEMENT IS LOCATED IN IC1.

Figure 10. Typical Block Diagram



NOTES:

1. REGULATION AND RIPPLE CHECK METERS MUST NOT BE GROUNDED THROUGH THREE-WIRE LINE CORD TO GROUND.
2. PERFORM CHECKS WITH LOCAL SENSING CONNECTIONS ONLY.

Figure 11. Test Connections For Constant Voltage Performance Checks

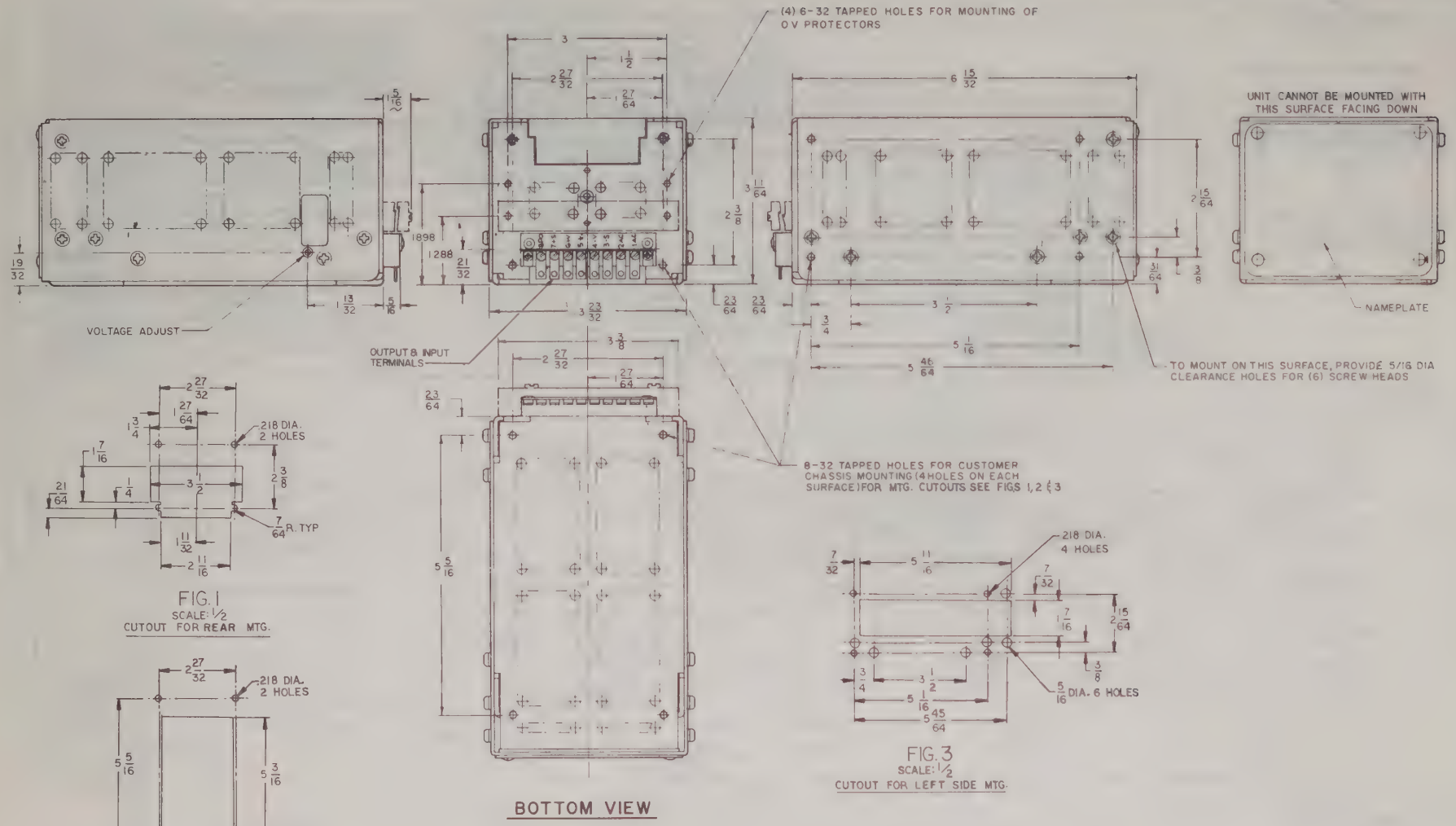

(4) 6-32 TAPPED HOLES FOR MOUNTING OF OV PROTECTORS
UNIT CANNOT BE MOUNTED WITH THIS SURFACE FACING DOWN
NAMEPLATE
VOLTAGE ADJUST
OUTPUT & INPUT TERMINALS
TO MOUNT ON THIS SURFACE, PROVIDE 5/16 DIA CLEARANCE HOLES FOR (6) SCREW HEADS
8-32 TAPPED HOLES FOR CUSTOMER CHASSIS MOUNTING (4 HOLES ON EACH SURFACE) FOR MTG. CUTOUTS SEE FIGS 1, 2 & 3
BOTTOM VIEW
.218 DIA. 2 HOLES
7/64 R. TYP
.218 DIA. 2 HOLES
7/64 P TYP
.218 DIA. 4 HOLES
5/16 DIA. 6 HOLES

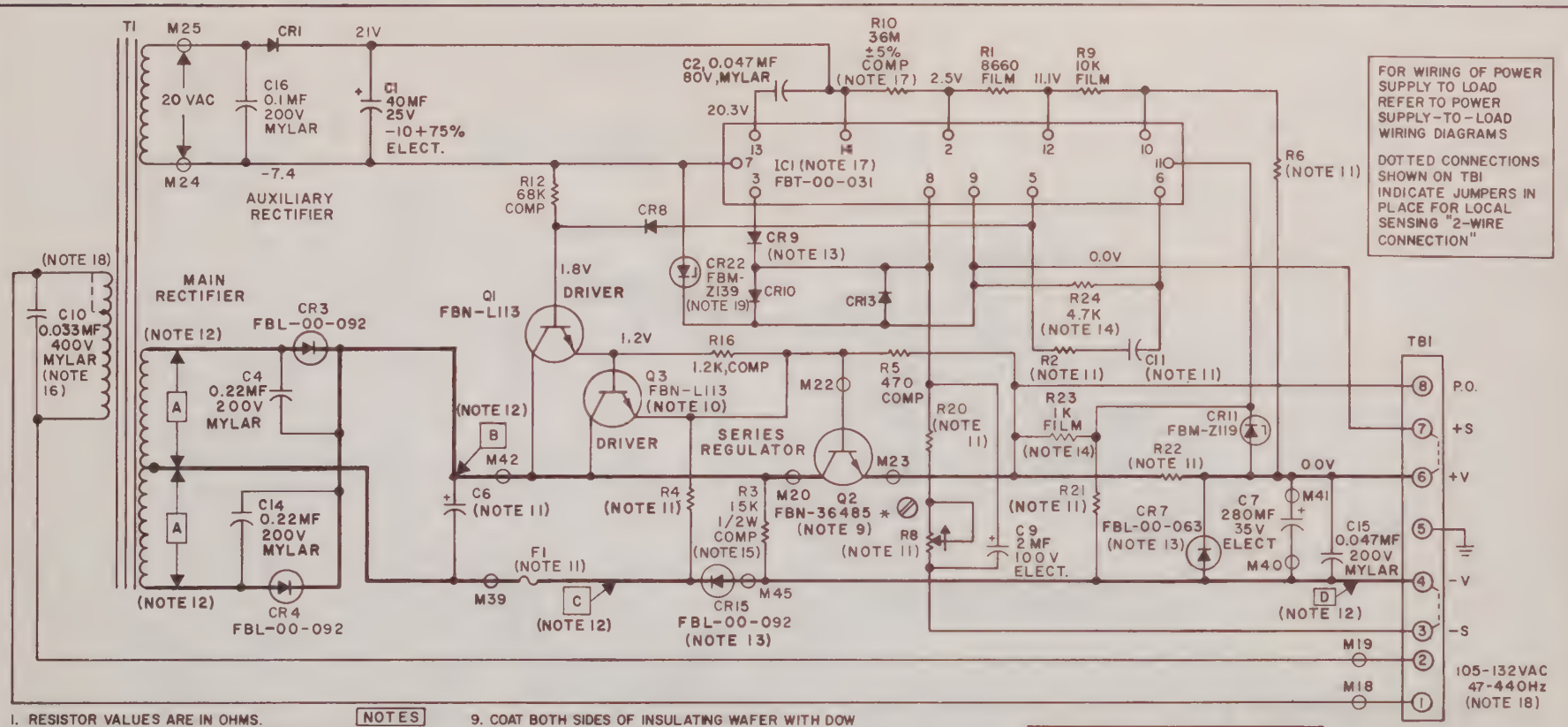
FIG. 1
SCALE: 1/2
CUTOUT FOR REAR MTG.

FIG. 2
SCALE: 1/2
CUTOUT FOR BOTTOM MTG.

FIG. 3
SCALE: 1/2
CUTOUT FOR LEFT SIDE MTG.

NOTE
CUSTOMERS MOUNTING SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 3/8."

Figure 12. Outline Drawing



NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/4 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±2% FILM ±1%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%, +100%; MYLAR ±10%; CERAMIC 10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. # FBL-00-030; USE IN 4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD.
6. DESIGNATION IS LAMBDA PART NUMBER.
7. DERATE CURRENT 10% FOR 47-57Hz, FOR 360-440Hz CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60Hz; OUTPUT: NOMINAL V DC. INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED; +S AND +V SHORTED, -S AND -V SHORTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. IF Q3 IS REPLACED RETAIN RADIATOR AND INSTALL WITH NEW TRANSISTOR.
11. SEE TABLE I FOR COMPONENT VALUES.
12. SEE TABLE I FOR VOLTAGE VALUES.
13. CR9, CR15 ARE REPLACED BY JUMPERS AND CR7 NOT USED ON MODELS LCS-A-2 THRU LCS-A-8.
14. R23 IS REPLACED BY JUMPER AND R24 IS 100K ON MODEL LCS-A-01
15. ON MODEL LCS-A-8, R3 IS 4.7K
16. ON UNITS WITH "V" OPTION C10 IS 0.01 MF, 600V.
17. ON UNITS WITH SERIAL NO. PREFIX A, R10 IS 68M ±10% AND IC1 IS FBT-00-010.
18. ON UNITS WITH "V" OPTION T1 HAS TAPPED PRIMARY. STD. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V INPUT (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A & B, "V" OPTIONS; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
19. CR22 NOT USED ON UNITS WITH SERIAL NO. PREFIXES A-C.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO PREFIXES A-D.

MODELS
LCS-A-2
LCS-A-3
LCS-A-3P6
LCS-A-4
LCS-A-4P5
LCS-A-5
LCS-A-6
LCS-A-8
LCS-A-01

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY

LAMBDA
ELECTRONICS CORP.
MELVILLE, L.I., NEW YORK
A Veeco SUBSIDIARY

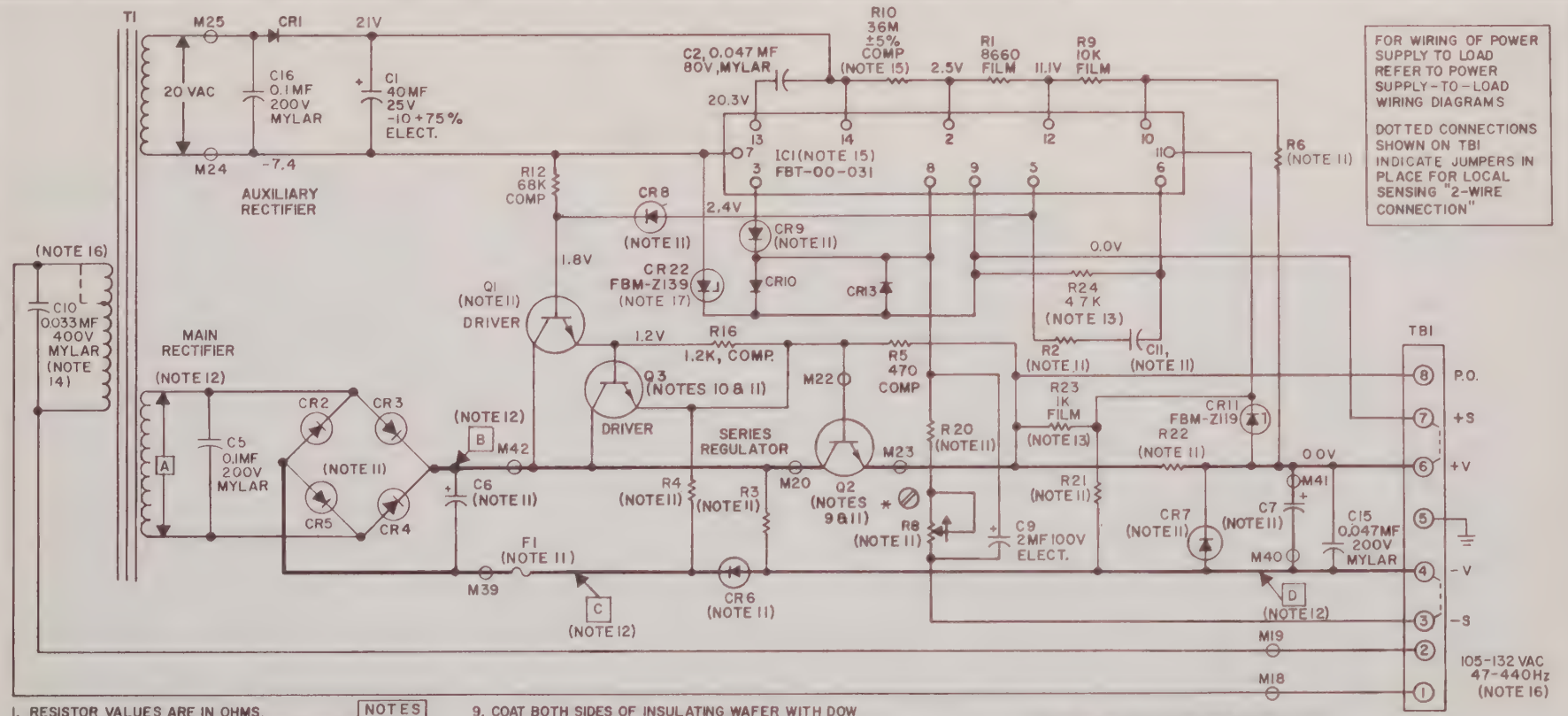
TABLE I

DATA REFERENCES FOR MODELS

LCS-A-2 THRU LCS-A-8, LCS-A-01

Models	Schematic Voltage Measurements				Schematic Components									
	A (VAC)	B (VDC)	C (VDC)	D (VDC)	C6 -10+100% ELECT	C11 ±10%, 200V MYLAR	F1 (AMPS)	R2 ±10%, 1/4W COMP	R4 ±10%, 1/2W COMP	R6 ±1%, 1/4W FILM	R8 ±10% 1W	R20 1/4W FILM	R21 1/4W FILM	R22 ±5%, 5W WW
LCS-A-2	8.1	6.8	2.0	2.0	3,500 mf 15 vdc	0.0033 mf	7	220	1.0K	105	2,000 WW	1,470* ±1%	1,700 ±2%	0.166
LCS-A-3	9.8	10.8	-3.0	-3.0	3,500 mf 15 vdc	0.0033 mf	7	220	2.2K	187	2,000 WW	2,400* ±2%	7,150 ±1%	0.166
LCS-A-3P6	9.8	10.2	-3.6	-3.6	3,500 mf 15 vdc	0.0033 mf	7	220	2.2K	187	5,000 WW	2,400* ±2%	9,090 ±1%	0.166
LCS-A-4	11.7	12.5	-4.0	-4.0	3,500 mf 15 vdc	0.0033 mf	7	220	2.2K	187	5,000 WW	3,000* ±5%	10,000 ±1%	0.166
LCS-A-4P5	11.7	12.0	-4.5	-4.5	3,500 mf 15 vdc	0.0033 mf	7	220	2.2K	182	5,000 WW	3,000* ±5%	11,800 ±1%	0.166
LCS-A-5	12.5	12.7	-5.0	-5.0	2,500 mf 20 vdc	0.0033 mf	7	220	2.2K	215	5,000 WW	3,600* ±5%	10,500 ±1%	0.21
LCS-A-6	13.8	13.5	-6.0	6.0	2,500 mf 20 vdc	0.0033 mf	7	220	3.9K	215	5,000 WW	4,700* ±2%	13,300 ±1%	0.21
LCS-A-8	16.3	15.1	-8.0	-8.0	2,500 mf 20 vdc	0.0033 mf	5	220	3.9K	210	5,000 WW	6,800* ±2%	18,200 ±1%	0.21
LCS-A-01	13.8	12.5	-7.6	-7.0	2,500 mf 20 vdc	0.0033 mf	5	220	750 ±5%, 3W WW	332	9,000 CERMET	Jumper	4.7K ±10% COMP	0.125 3W

*JUMPER, on units with "S" option.



FOR WIRING OF POWER SUPPLY TO LOAD REFER TO POWER SUPPLY-TO-LOAD WIRING DIAGRAMS

DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING "2-WIRE CONNECTION"

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO PREFIXES A-D

NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/4 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±2% FILM ±1%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%, +100%; MYLAR ±10%; CERAMIC 10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. #FBL-00-030, USE IN 4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD.
6. DESIGNATION IS LAMBDA PART NUMBER
7. DERATE CURRENT 10% FOR 47-57Hz, FOR 360-440Hz CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60Hz; OUTPUT: NOMINAL V DC. INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED; +S AND +V SHORTED, -S AND -V SHORTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. IF Q3 IS REPLACED RETAIN RADIATOR AND INSTALL WITH NEW TRANSISTOR.
11. SEE TABLE I FOR COMPONENT VALUES.
12. SEE TABLE I FOR VOLTAGE VALUES.
13. ON MODELS LCS-A-02 THRU LCS-A-04 R23 IS REPLACED BY A JUMPER AND R24 IS 100K.
14. ON UNITS WITH "V" OPTION C10 IS 0.01MF, 600V.
15. ON UNITS WITH SERIAL NO. PREFIX A, R10 IS 68M ±10% AND IC1 IS FBT-00-010.
16. ON UNITS WITH "V" OPTION T1 HAS TAPPED PRIMARY. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V INPUT (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A & B, "V" OPTIONS; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
17. CR22 NOT USED ON UNITS WITH SERIAL NO. PREFIXES A-C.

MODELS	
LCS-A-10	LCS-A-28
LCS-A-12	LCS-A-36
LCS-A-15	LCS-A-48
LCS-A-18	LCS-A-02
LCS-A-20	LCS-A-03
LCS-A-24	LCS-A-04

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY

LAMBDA

ELECTRONICS CORP.

MELVILLE, L.I., NEW YORK

A Veeco SUBSIDIARY

TABLE I

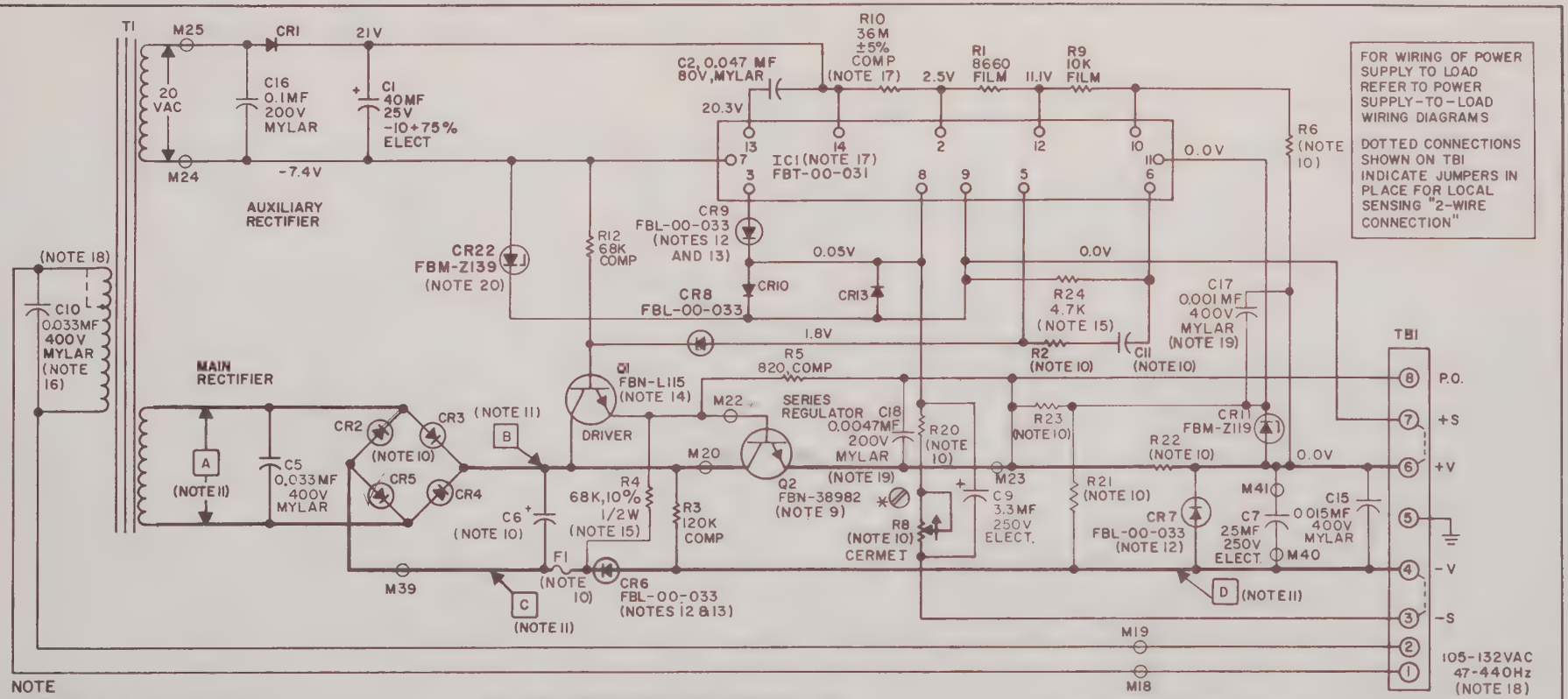
DATA REFERENCES FOR MODELS

LCS-A-10 THRU LCS-A-48, LCS-A-02 THRU LCS-A-04

	Schematic Voltage Measurements				Schematic Components																
	A	B	C	D	C6	C7	C11	CR2-CR5	CR6	CR7	CR8	CR9	F1	Q1, Q3	Q2	R2	R3	R4	R6	R8	R20	R21	R22
Models	(VAC)	(VDC)	(VDC)	(VDC)	-10+100% ELECT	-10+100% ELECT	±10%,200V MYLAR	*FBL-00-	*FBL-00-	*FBL-00-	*FBL-00-	*FBL-00-	(AMPS)	*FBN-	*FBN-	±10%,1/4W COMP	±10%,1/2W COMP	±10%, 1/2W COMP	±1%,1/4W FILM	±10% 1W	1/4W FILM	1%,1/4W FILM	±5% WW
LCS-A-10	20.0	18.2	-10.0	-10.0	1,700 mf 30 vdc	280 mf 35 vdc	0.0033 mf	092	Jumper	Not Used	030	Jumper	5	L113	36485	220	4,700	3.9K	191	5,000 WW	8,200**	26,100	0.21 5W
LCS-A-12	20.8	17.2	-12.0	-12.0	1,700 mf 30 vdc	280 mf 35 vdc	0.0033 mf	092	Jumper	Not Used	030	Jumper	5	L113	36485	220	4,700	8.2K	196	9,000 CERMET	9,100** ±2%	30,900	1.25 5W
LCS-A-15	23.8	18.8	-15.0	-15.0	1,700 mf 30 vdc	160 mf 60 vdc	0.0033 mf	092	Jumper	Not Used	030	Jumper	5	L113	36485	220	4,700	8.2K	187	9,000 CERMET	9,100** ±2%	40,200	0.25 5W
LCS-A-18	28.0	21.6	-18.0	-18.0	1,200 mf 40 vdc	160 mf 60 vdc	0.0033 mf	092	Jumper	Not Used	030	Jumper	5	L113	36220	220	10,000	8.2K	240	20,000 WW	12,000** ±1%	34,800	0.39 5W
LCS-A-20	29.4	21.5	-20.0	-20.0	1,200 mf 40 vdc	160 mf 60 vdc	0.0033 mf	092	Jumper	Not Used	030	Jumper	3	L108	36220	220	10,000	8.2K	221	20,000 WW	15,000** ±5%	44,200	0.39 5W
LCS-A-24	32.6	22.0	-24.0	-24.0	950 mf 50 vdc	90 mf 85 vdc	0.0033 mf	092	Jumper	Not Used	030	Jumper	3	L108	36220	220	10,000	18K	172	20,000 WW	12,000** ±1%	66,500	0.39 5W
LCS-A-28	36.5	23.6	-28.0	-28.0	950 mf 50 vdc	90 mf 85 vdc	0.0033 mf	092	Jumper	Not Used	030	Jumper	3	L108	36220	220	33,000	18K	215	20,000 WW	22,000** ±5%	62,500	0.50 3W
LCS-A-36	51.4	36.5	-36.0	-36.0	400 mf 100 vdc	90 mf 85 vdc	0.0033 mf	094	Jumper	Not Used	030	Jumper	3	L108	36487	220	33,000	18K	191	20,000 WW	27,000** ±5%	87,600	0.50 3W
LCS-A-48	59.0	35.5	-48.0	-48.0	400 mf 100 vdc	90 mf 85 vdc	0.0047 mf	036	Jumper	Not Used	033	Jumper	1-1/2	L108	35902	33	33,000	18K	150	20,000 CERMET	30,000** ±1%	174,000	0.50 3W
LCS-A-02	23.8	18.8	-18.6	-18.0	1,200 mf 40 vdc	90 mf 85 vdc	470 pf	092	092	092	030	030	3	L108	36220	68	4,700	1,200 ±3% 3W WW	249	2,000 CERMET	Jumper	1,000 ±1% COMP	0.21 3W
LCS-A-03	36.5	19.6	-32.6	-32.0	950 mf 50 vdc	90 mf 85 vdc	0.0047 mf	036	030	030	030	030	3	L108	36487	220	10,000	2,500 ±3% 3W WW	182	5,000 CERMET	Jumper	Not Used	0.50 3W
LCS-A-04	63.0	29.0	-60.0	-60.0	400 mf 100 vdc	25 mf 250 vdc	0.0022 mf	033	036	036	033	036	1-1/2	L108	35902	220	33,000	5,000 ±3%,3W WW	226	75,000 CERMET	Jumper	Not Used	50 3W

*Lambda part number.

**JUMPER, on units with "S" option.



FOR WIRING OF POWER SUPPLY TO LOAD REFER TO POWER SUPPLY-TO-LOAD WIRING DIAGRAMS

DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING "2-WIRE CONNECTION"

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO PREFIXES A-D.

NOTE

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/4 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±2% FILM ±1%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%, +100%; MYLAR ±10%; CERAMIC 10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. #FBL-00-030; USE IN 4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD.
6. DESIGNATION IS LAMBDA PART NUMBER.
7. DERATE 40°C CURRENT RATING 10% FOR 47-57 Hz INPUT
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60Hz; MAX. RATED VOLTAGE NO LOAD. INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED; +S AND +V SHORTED, -S AND -V SHORTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. SEE TABLE I FOR COMPONENT VALUES.
11. SEE TABLE I FOR VOLTAGE VALUES.
12. CR9, CR6 AND CR7 ONLY USED ON MODEL LCS-A-05.
13. CR6 AND CR9 ARE REPLACED BY JUMPERS ON MODELS LCS-A-100 THRU LCS-A-150.
14. IF Q1 IS REPLACED, RETAIN RADIATOR AND INSTALL WITH NEW TRANSISTOR
15. R24 IS 100K AND R4 IS 33K, 5%, 5W ON MODEL LCS-A-05.
16. ON UNITS WITH "V" OPTION C10 IS 0.01 MF, 600V.
17. ON UNITS WITH SERIAL NO. PREFIX A, R10 IS 68M ±10% AND IC1 IS FBT-00-010.
18. ON UNITS WITH "V" OPTION T1 HAS TAPPED PRIMARY. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V INPUT (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A & B, "V" OPTIONS; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
19. C17 AND C18 ONLY USED ON MODEL LCS-A-05.
20. CR22 NOT USED ON UNITS WITH SERIAL NO. PREFIXES A-C.

MODELS
LCS-A-100
LCS-A-120
LCS-A-150
LCS-A-05

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY

LAMBDA

ELECTRONICS CORP.

MELVILLE, L.I., NEW YORK

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TABLE I

DATA REFERENCES FOR MODELS

LCS-A-100 THRU LCS-A-150, LCS-A-05

Models	Schematic Voltage Measurements				Schematic Components										
	A (VAC)	B (VDC)	C (VDC)	D (VDC)	C6 -10+100% ELECT	C11 ±10%,200V MYLAR	CR2-CR5 *FBL-00-	F1 (AMP)	R2 ±10%,1/4W COMP	R6 ±1%,1/4W FILM	R8 ±10%,3/4W CERMET	R20 ±5%,1/4W FILM	R21 ±1%,1/4W FILM	R22 ±5%,3W WW	R23 1%,1/4W FILM
LCS-A-100	105	48.0	-100	-100	160 mf 200 vdc	0.0022 mf	033	1/2	220	287	75,000	75,000**	167,000	4	1,000
LCS-A-120	125	56.0	-120	-120	160 mf 200 vdc	0.0022 mf	064	1/2	220	249	75,000	91,000**	243,000	4	1,000
LCS-A-150	154	68.0	-150	-150	90 mf 300 vdc	0.0022 mf	064	3/8	220	261	75,000	110,000**	294,000	6.2 2W	825
LCS-A-05	125	56.0	-120.6	-120.0	160 mf 200 vdc	0.0022 mf	064	3/8	220	243	150,000	Jumper	Not Used	2	Jumper

* Lambda part number.

** JUMPER, on units with "S" option.

5-Year
Guarantee
We warrant each instrument manufactured by us, and sold by us or our authorized agents, to be free from defects in material and workmanship, and that it will perform within applicable specifications for a period of five years after original shipment. Our obligation under this guarantee is limited to repairing or replacing any instrument or part thereof, (except tubes and fuses) which shall, within five years after delivery to the original purchaser, be returned to us with transportation charges prepaid, prove after our examination to be thus defective.
We reserve the right to discontinue instruments without notice, and to make modifications in design at any time without incurring any obligation to make such modifications to instruments previously sold.

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